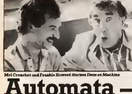
POPULAR Computing WEEKLY

Only 40p.

6-12 SEPTEMBER 1984

It's the best selling weekly

Vol 3 No 36



Mel Croucher and Frankie Howerd discuss *Deus ex Machina*

Automata — the movie

PORTSMOUTH-based software house Automata has announced what it claims is an entirely new concept in computer entertainment.

Deus ex Machina is a unique combination of recorded music, voices and computer graphics — a kind of interactive cartoon or play.

Ian Dury, Jon Pertwee, Frankie Howerd and EP Thompson are among those who take part and the £15 package for the 48K Spectrum — consists of two tapes. One contains 80K of program, loaded in two sections containing six computer 'games', and the other contains a complete audio sound-track of songs, music and dialogue.

Playing *Deus ex Machina*

continued on page 5▶

Atari delays plans

ATARI Corporation UK is to discontinue manufacture of its 600XL computer and has delayed an announcement — originally scheduled for last week — of its plans for a replacement home computer.

There is also growing speculation that the company may also cease production of its 800XL machine.

According to Jack Tramiel, who visited the UK despite the cancellation of Atari's launch, new products will be announced some time in the first two weeks of October.

An Atari spokesman said, "There are major new product developments on the way, but Atari is unwilling to formally launch them before all the details have been worked out.

"The 600XL will continue to be sold while stocks last, but research has shown a move towards machines with a higher memory and the 64K 800XL machine will then take over." The spokesman denied that the company had any plans to stop production of the 800XL.

As well as a new range of home computers Atari is expected to announce business micros compatible with IBM and Apple. These machines may not be manufactured by Atari, but bought from other companies under licence.

In the US, Atari is coming under pressure from creditors — Synapse are reported to be suing for $17m for software made under contract when Atari was part of Warner Communications.

Atari's 600XL machine

Philips MSX for UK?

PHILIPS may beat the Japanese manufacturers and be the first company to launch an MSX machine in this country.

The company's product marketing manager Sixto Rodriguez said, "Our MSX machine is now ready and we are

continued on page 5▶

Learn to Fly

COMPETITION

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View

OVER the last two years — with a number of key developments — software houses have been steadily moving towards the achievement of an interactive film.

Such a software 'movie' would differ from an ordinary film or cartoon in that it would be possible for the viewer to actually influence the development of the plot.

The first step was the text-only adventure which can be considered as a kind of simple interactive book. *The Hobbit* was the next development — a book with pictures.

Ideas were also being drawn from arcade games like *Pole Position* and *Track and Field* — both fundamentally interactive cartoons.

But, in all of these programs something very important is missing — sound. In film terms they are all silent movies — the Buster Keatons of an emerging industry.

The first, technically successful, attempt to add a separate recorded soundtrack died at the 'box office'. *The Ugly Duckling* was an educational program from a small American house called Software Movies. It used a clever pulse system to link the computer and a cassette recorder containing a voice-over telling the story.

This week Automata has brought the interactive film a step nearer with *Deus ex Machina* — the first serious attempt to produce a commercial computer 'talkie'.

In style, *Deus ex Machina* owes much more to film than it does to computer software and the result is highly original.

However, there is still a very long way to go. Ultimately, the goal must be to use so equivalent technology to laser discs to produce a full-blown feature film linked to a computer in such a way that the viewer can actually 'play the movie'.

POPULAR Computing WEEKLY Vol 3 No 36

Presents...

Futures...

Try to puzzle out the sliding block in the Star Game for the Oric ... edit or write programs using *Quill* on the QL ... and sorting data lists on the Spectrum

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How to submit articles Articles which are submitted for publication should not be more than 2000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted. **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

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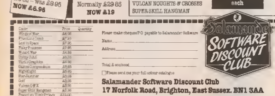
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Commodore acquire new US micro

COMMODORE has announced it is negotiating to sell a 68000-based micro — a machine based on the same family of processor chips as Sinclair's QL and Apple's Macintosh.

The company is in the process of buying the California-based micro manufacturer Amiga which is currently developing a 32-bit 68000-based competitor for Apple's Macintosh. Amiga's micro will contain 128K Ram, 64K Rom, a built-in disc drive and modem. It will sell for around $1,500

Just a few days before the Commodore announcement Atari US filed a suit against Amiga charging it with breaking an agreement, signed in March, under which Amiga was to develop graphics chips for Atari machines.

phics chips for Atari machines.

The Atari move is seen as a tactic to delay Commodore's launch of the Amiga machine while it finalises details fo its own 68000-based Macintosh competitor

In the suit Atari claims that Amiga did not complete the contract, and that it refunded the £0 8m paid to them by Atari. Atari says that Amiga later completed the chips and offered them for sale at a higher price

The Atari suit comes only a month after Commodore filed a suit against four of its former engineers, now with Atari, claiming that they had stolen Commodore design secrets.

Philips MSX

◄continued from page 1

hoping it will appear sometime in September"

The Philips machine will be Z80 based and is expected to have at least 64K Ram.

Chris Greet of Toshiba, the company which expected to be first with an MSX on the UK, said. "I had no knowledge of this, but I would be delighted if they do launch a machine."

● Another company due to bring out an MSX machine this year is AVT Goldstar of Korea.

Its 64K machine will probably cost around £200, thus undercutting Toshiba's machine by around £80 The AVT machine will be launched at the Personal Computer World show on September 19

Micro Dealer UK is to have exclusive distribution rights in this country

Weetabix acts against Ubik

TYNESIDE company Ubik's game *Paranoid Pete* will not now be appearing in the shops.

Weetabix complained that the characters portrayed in the game resembled its own 'Weetabix men' used in advertising too closely

"When we first started work on *Paranoid Pete* we were working in collusion with Weetabix to produce a game based on their characters," said Ubik's marketing director Danielle Allan. "But when the game was complete, Weetabix weren't happy with the result.

"In order to be able to bring out a game ourselves, we changed many aspects of it, but Weetabix were not satisfied and it has now been shelved.

However, Ubik do have two more games scheduled for release in October *Razzmatazz* is based on the ITV children's programme of the same name, to be brought out under licence on the Spectrum, with a Commodore 64 version to follow, and a comical game for the BBC provisionally entitled *The Professor* Both are expected to be priced around £6 95.

Automata — the movie

◄continued from page 1

involves first loading the Spectrum program and then playing both the computer game and the sound-track cassette — on a cassette player or hi-fi — at the same time. The two are synchronised by a count-down at the start and remain together for the duration of the game, around one hour

The sound-track cassette tells the story of the life of a human being, created within a vast computer The computer program depicts the birth and development of the human from the first string of DNA through birth and adolescence to maturity, and finally old age and death.

As the program proceeds the player is able to prolong the life of the human through the various stages of its life through a series of interactive computer 'games' The goal is to live a 'successful' life — as monitored by a running percentage score.

On the sound track cassette Jon Pertwee is the Storyteller who narrates the tale, Frankie Howerd is The Defect Police, Ian Dury is Fertiliser and historian and CND campaigner EP Thompson plays The Voice of Reason. The music is performed by Automata's Mel Croucher and a jazz singer, Donna Bailey

The game was designed, scripted and produced by Mel Croucher and the computer programs was written by Automata's in-house programmer, Andrew Stagg.

The complete package of *Deus ex Machina*, including two tapes and a poster containing the complete script, will be available from next week.

Ian Dury with programmer Andrew Stagg

Adventure for QL out soon

AFTER *West* for the Commodore 64, Talent Computer Systems of Glasgow is working on a text adventure for the QL.

"It's very much a *Dungeons and Dragons* style game, with wizards, dwarfs and so on," said Talent's John Tweedie. "It has a working title of *Beneath the Mountain* and about 260 locations

"*Beneath the Mountain* will be noticeably bigger than most other games of its kind, and is aimed at seasoned adventurers rather than the beginner," he continued.

"Events happen in 'real time', and it contains a random maze generator, so that there are a number of ways to complete the game, and no two games will be the same"

Beneath the Mountain should be available in November, priced in the region of £18

Talent is also converting West to run on the QL.

Oric drops counter suit

ORIC Products International has now withdrawn its counter suit against its advertising agency KMP (see *PCW*, August 23).

At a hearing in the High Court last week, Oric was barred from attempting any further suits against KMP based on grounds of 'wrongful advice

Oric has also been ordered to pay at £200 000 debt to KMP, and the advertising agency's court costs

Acorn changes prices

ACORN Computer has revised the prices of two of its products. The price of the BBC single disc drive has been reduced by £80 to £199, while the price of the Z80 second processor package has risen by £100 from £299 to £399

Commenting on the price drop of the disc drive an Acorn spokesman said. "Sales have increased considerably allowing us to cut the price The dual disc drive price has also recently been reduced — down by £105 to £699."

Acorn says that the reason for the increase in the second processor's price is to enable dealers to receive a larger margin on sales, and thus have the resources to offer better customer support.

ZX Microfair

THE twelfth ZX Microfair will be held on September 8, at its usual venue, Alexandra Palace in North London. The fair will be open from 10.00am to 6.00pm. Tickets on the door cost £1 25 for adults and 60p for children.


llamasoft
ORIGINAL SOFTWARE DESIGN

Letters

Quarter speed

I feel I must reply to M Valentine's comments (August 23) on my letter about the Electron. The reason why most BBC software will not run on the Electron is because it is either written in Mode 7 or uses advanced sound commands, neither of which are found in the Electron.

Those which do run, often do so at a quarter speed.

Nicholas Haigney
(still a lonely Electron user)
80 Parkdale Road
Sheldon
Birmingham

Support the Electron

I thought I would write just a few lines regarding Nicholas Haighey's letter (PCW Vol. 13 No 32) on supporting the Electron.

I have a dream. That one day, the computer press will not call the Electron 'slothful' or anything else to do with the speed difference when compared to a BBC model B.

In that same dream I see that one day the computer press will not treat the Electron user as an absolute idiot/prat/wally because they have access to superior machines.

I also see in that dream a magazine devoted to Acorn Computers which does not publish silly articles on how to use the Electron keyboard, which really isn't all that difficult. Have they seen a Spectrum keyboard lately I ask myself.

And I see Commodore 64 owners actually admitting that they were conned into buying their computer because they thought it had 64K bytes of user memory — also C64 owners admitting that if they bought a fast-load cassette loading can be achieved faster than using the 1641 disk drive.

May I also say that the first disc drives are now available for the Electron made by Pace, and Sir Computers of Cardiff are the first company to come up with a Mode 7 adaptor.

John T W Beckett
15 Surey Avenue
Droylsden
Manchester

PS. Who is this Boris Allen person anyway? It must be a pseudonym.

I fully expect that you will have displeased some Spectrum and C64 owners. Boris, however, you will have mortally wounded.

Who's who?

After seeing the picture appearing above my last Ziggurat column (August 23), millions of concerned fans have written asking whether I am *really* Boris Allan, or vice versa. The truth is that, when being photographed for the column I jokingly wore one of the Boris Allan Horror Masks which will be on sale nationwide in time for Halloween.

David Langford
Reading
Berks

Copy facility

What a pleasure to use the Spectrum with the Microdrive. I would like to put my cassette deck in the rubbish bin if I could use the microdrive with every commercial program. But you have to spend hours to adapt each one for the Microdrive.

I am having a lot of problems converting *Micro Prolog*. This program is very boring to load and I cannot find any way to put it on Microdrive. I read in issue 28 that Sinclair sent a letter to all the software houses instructing them to include a Microdrive copy facility in their cassette. Well, *Micro Prolog* is a Sinclair program, very expensive (especially here on the continent) and quite unadapted to be used with a cassette deck.

If any reader does know how to put *Micro Prolog* on to Microdrive, I will have the pleasure in sending him or her a special gift: for example, a can of snails and the recipe.

Vincent Magos
Rue Louis Hap, 195
1040 Bruxelles
Belgium

PS. Please more and more articles like *Baud Walk* — we are not interested any more in copying not silly programs of *STAR WARS*

Alienated readers

I'm writing to you to protest about the infamous 'Smut Debate' which is currently taking up space in your letters page.

So far, all the people involved have been men. I thought at least one other woman might have had something to say on the subject, but since none have, here goes.

First, your reply to Christopher Bryant's letter: so it's OK to degrade women, as long as you offer value for money and aren't boring. Hmm. And there was I thinking that the idea was to get more women interested in computing. Obviously, I've been sadly misled by the various other comments you've made from time to time on this subject.

Secondly, the letter from the proprietors of Titan Programs leaving aside the trade of rude names which they hurl at Mr Bryant in lieu of a reasoned defence, it soon becomes clear from the text of their letter ("Out there in the big wide world, there are people yearning for smut . . .") that women aren't actually people after all . . . unless they are going to prove that a proportion of their customers are women?

As to whether you should carry their advertising: by doing so, you stand to alienate at least some of your readers. I for one will be going back to reading the Tony Bridge column in the newsagent if you're not careful. An awful lot of micro users are teenage boys — are you sure you want to condone degrading women to them — your reply to Mr Bryant's letter certainly seems to set the seal of approval on this kind of behaviour. If women are worthy of this kind of treatment, why not black people, or Jews, or any other kind of minority?

A final thought. According to your expressed policy, it is worse for a kid at home to copy the odd tape than it is for *him* to indulge in the worst kind of blatant sexism. Any other women (or sane men) out there agree with me?

Liz Holliday
108 Twyford House
Chisley Road
London

The editorial team tries very hard to ensure that the editorial content of the magazine is non-sexist.

However, attempting to control advertising is not easy and smacks of censorship. Where do you draw the line. Do you ban most of the advertising because it promotes excessively violent male attitudes, as in arcade shoot 'em ups, for example?

ATARI PRICES SLASHED

"And stop calling it a clearance sale!"

Reset the system

There was really no need for Simon Springett to unscrew his Interface 1 unit in order to load the *Automania* program by Mikrogen (see August 23 issue).

It is true that really long programs like Psion's *Chequered Flag* are incompatible with Interface 1. However, instead of disconnecting each time, and possibly damaging the edge connector, type in *Randomise Usr 0* and then load the program. That totally resets the system and disables the Microdrive, allowing any program to be loaded.

M Scott
7 Beech Grove
Springwell
Gateshead
Tyne and Wear

DIY QL

Is it true you can build your own QL using parts of the machine sent to you each week by Sinclair — first the keyboard, then the chips?

S A Weir
43 Elie Avenue
Deans
Livingston
W Lothian

No.2

QUICKSILVA Computing SECTION

LATEST NEWS

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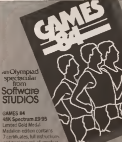


CHART ACTION

QUICKSILVA TOP 20 JUNE 1984

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1	Trashman*	– CBM 64 –	£7 95
2	Fred	– 48K Spec –	£7 95
3	Ant Attack	– 48K Spec –	£6 95
4	Boogaboo	– CBM 64 –	£7 95
5	The Snowman	– 48K Spec –	£6 95
6	Mined-Out	– Electron –	£6.95
7	Gatecrasher*	– 48K Spec –	£6.95
8	Sting 64	– CBM 64 –	£7 95
9	Bugaboo	– 48 Spec –	£6.95
10	Dragonsbane	– 48K Spec –	£6 95
11	Escape*	– CBM 64 –	£7 95
12	Aquaplane	– CBM 64 –	£7 95
13	Gatecrasher*	– BBC 'B' –	£6 95
14	Gatecrasher*	– Electron –	£6 95
15	Velnor's lair*	– Oric/Atmos –	£6 95
16	Mined Out*	– Oric/Atmos –	£6 95
17	Ultisynth	– CBM 64 –	£14 95
18	Drum Kit*	– BBC 'B' –	£14 95
19	Tornado	– Vic 20 –	£5 95
20	Quintic Warrior	– CBM 64 –	£7 95

*New Release

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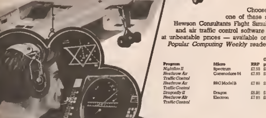
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Heathrow Air Traffic Control	Commodore 64	£7.95	£5.50
Heathrow Air Traffic Control	BBC Model B	£7.95	£5.95
Dragonfly II	Dragon	£5.95	£4.75
Heathrow Air Traffic Control	Electron	£7.95	£5.50

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1

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1

Turbo Track

Make sure you don't run out of fuel as you race around the track in this game for Commodore 64 by P Biddle

The object of the game is to race your car around a race track avoiding the oil slicks which reduce your fuel so you are unable to reach home.

Luckily for you there are some fuel pumps scattered along the course that once hit gain you fuel — fail to hit any of these and you will find you haven't enough fuel to reach home.

Hitting another car when overtaking will result in your demise and the end of the game, and the amount of fuel remaining and the distance left from home will be displayed.

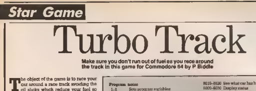
Control your car using the *Z* and *C* keys.

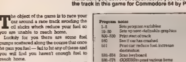
Program notes

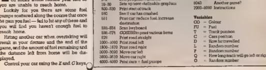
1–2	Sets program variables
10–30	Sets up user-definable graphics
500–530	Print start of track
640	See if car has crashed
651	Print car reduce fuel increase destination
655–664	Scan keyboard
665–675	*GOSUBS* to print various items
676	Print road straight
1000–1060	Print road left
1800–1870	Print road right
3000–3030	Move car left
3800–3610	Move car right
4000–4080	Print cars + fuel pumps
8010–8530	See what car has hit
6000–6030	Display status
6040	Another game?
7000–8000	Instructions

Variables

CO	=	Colour
FU	=	Fuel
T	=	Track position
C	=	Cars position
D	=	How far travelled
L	=	Random number
F	=	Random number
Q	=	How long track will go left or right
O	=	Random number







```
0 GOSUB7000
1 CO=30720:POKE36878,5:POKE36877,
180:FU=800
2 T=7:C=7691:POKE650,255
5 POKE36869,255:PRINT"[CLR]"
10 DATA1,1,1,1,1,1,1,1,128,128,128
,128,128,128,128,128
20 DATA128,64,32,16,8,4,2,1,1,2,4,
8,16,32,64,128
30 DATA24,124,252,254,127,63,30,12
,165,255,189,60,24,90,126,90
40 DATA146,84,56,254,56,84,146,0,0
,0,0,0,0,0,0,0
45 DATA248,252,138,185,137,185,
250,252
50 FORI=7168TO7239:READJ:POKEI,
J:NEXT
500 REM
510 FORI=1TO50
520 PRINTTAB(T)"@GGGGGGGDA"
530 NEXT
550 IFPEEK(C+22)<>7ANDPEEK(C+22)<>
32THENGOSUB5000
551 POKEC,5:POKEC+CO,0:D=D+1:FU=FU
-1:IFFU<=0THEN6000
552 GETA$:IFD>=1000THEN8000
553 IFA$="Z"THENGOSUB3000
554 IFA$="C"THENGOSUB3500
556 IFW=1ANDE=1THENGOSUB4000
557 P=INT(RND(1)*20)+1:IFP>10ANDP
<20THENGOSUB4000
558 IFP=9THENGOSUB4050
559 IFP=5THENGOSUB5500
560 R=INT(RND(1)*9)+1
565 IFR=7THENGOSUB1000
570 IFR=6THENGOSUB1500
574 IFW=1THENGOSUB1025
575 IFE=1THENGOSUB1525
576 PRINTTAB(T)"@GGGGGGGGA"
577 GOTO550
580 PRINTTAB(T)"@GGGGGGGGGGA"
1000 REM
1010 L=INT(RND(1)*6)+1
1020 Q=0:W=1
1025 IFT<=1THENRETURN
1030 PRINTTAB(T)"CGGGGGGGC"
1040 T=T-1:Q=Q+1
1050 IFQ=LTHENW=0:RETURN
1060 RETURN
1500 REM
1510 L=INT(RND(1)*6)+1
1520 Q=0:E=1
1525 IFT>=10THENRETURN
1530 PRINTTAB(T+1)"BGGGGGGGB"
1540 T=T+1
1550 Q=Q+1
1560 IFQ=LTHENE=0:RETURN
1570 RETURN
3000 REM
3010 POKEC,7:C=C-1:POKEC,5:POKEC+
CO,0
3020 RETURN
3500 POKEC,7:C=C+1:POKEC,5:POKEC
+CO,0
3510 RETURN
4000 REM
4010 O=INT(RND(1)*6)+1
4020 PRINTTAB(T+O)"O"
4080 RETURN
5000 REM
5010 IFPEEK(C+22)=5THEN5040
5020 IFPEEK(C+22)=4THENFU=FU-10:POKE
36877,250:FORI=1TO100:NEXT:POKE368770
5030 IFPEEK(C+22)=8THENFU=FU+10:
RETURN 5040 POKEC,6:POKEC+CO,0
5050 POKE36878,15
5060 POKE36877,220:FU=FU-10
5080 FORJ=15TO0STEP-.05:POKE36878,J
:NEXT:POKE36878,15:POKE36877,0:GOTO
6000
5500 REM
5510 O=INT(RND(1)*6)+1
5520 PRINTTAB(T+O)"M"
5530 RETURN
6000 POKE36869,240:PRINT"[CLR]"
6010 PRINT:PRINT:PRINT
6020 PRINT"YOU HAD"FU"UNITS OF
FUEL LEFT."
6030 PRINT:PRINT"AND WAS"1000-
D"MILES FROM      HOME."
6040 PRINT:PRINT:PRINT:PRINT"
ANOTHER GAME (Y/N)?"
6044 FORI=1TO2000:NEXT
6045 POKE198,0
6050 GETA$:IFA$=""THEN6050
6060 IFA$="Y"THENRUN
6070 IFA$="N"THENPRINT"[CLR]":END
6080 GOTO6050
7000 PRINT"[CLR]"
7010 PRINT:PRINT"         TURBO TRACK"
7020 PRINT"          -----------"
7025 PRINT:PRINT"   BY P. BIDDLE  +"
7026 PRINT"        A. ASHWORTH"
7030 PRINT:PRINT:PRINT"GUIDE YOU CAR
THROUGH THE DEADLY RACE TRACK"
7040 PRINT"AVOIDING THE CARS AND OIL
SLICKS WHILE HITTING FUEL PUMPS"
7045 PRINT"FOR EXTRA FUEL"
7050 PRINT:PRINT:PRINT" GOOD LUCK"
7060 POKE198,0:WAIT198,1:RETURN
8000 POKE36869,240:PRINT"[CLR]":
PRINT:PRINT:PRINT"CONGRATULATIONS!!"
8005 POKE36877,0
8010 PRINT:PRINT"YOU HAVE COMPLETED
THE COURSE WITH"FU
8020 PRINT"UNITS OF FUEL LEFT"
8030 GOTO6040
```

Quick on the draw

***Graham Taylor** talks to a commercial computer graphics house – Communication Studio*

It is easy to get carried away with the visual effects achieved by the latest computer games and forget there is a whole other world of computer graphics – the commercial world where spectacular computer generated designs are used in TV advertisements, rock videos and feature films.

Sometimes the complexity of these affects is such that we can even be fooled into thinking that we are watching a conventionally photographed film or video image and not a computer effect at all.

Communication Studio is one company which specialises in the commercial application of computer graphics. More than that, it presents one of the burgeoning centres for an entirely new kind of professional computer user – the graphic designer with a light pen.

As the director of the Communication Studio, Philip Bergman explains "We come from a variety of different commercial backgrounds – publishing, advertising, the BBC – but few of us have massive amounts of computer knowledge."

The bulk of the Studio's work is concerned with making promotional and sales displays for large companies. "There tends to be a lot of graph and diagram work, percentage share of the market by some particular product displayed graphically and so on. It's the kind of thing which usually involves hundreds of slides on a carousel – we can do the same thing with a much wider range of graphic possibilities."

We watch a section from a presentation for a well known cigarette brand. Cigarettes grow, shrink, change colour en masse and singly in an illustration of their position in the market. "Obviously we don't have to redraw each item each time for each new section – the design, say, for the cigarette can be stored in the memory and recalled whenever necessary," explained Philip.

Communication Studio clients include, amongst others, Penguin Books, The Open University, Austin Rover, Kelloggs, Lego and Thames Television. "We did part of the opening credit sequence for the TV series *Database*."

A current project involves presenting some of the material from a medical textbook. "It's interesting because it involves some fairly detailed and accurate work without losing the clear lines that are part of the character of computer graphics."

Watching one of the graphic designers at work I am surprised by how similar the design program he is using is to those graphics packages you might buy for a Commodore or a Spectrum. It has a menu with a list of things like *Draw Line*, *Fill*, *Circle*, *Text*, *Change colour* and so on.

Somehow it's a shock to see something as familiar as 'Press F1 to ' on all this technology. It even says 'are you really sure? Y/N' if you are threatening to do something drastic like wipe a design.

"It reflects the fact that the people using the program are not trained in computers and they need as much user – friendliness as someone who has just bought their computer and is wondering what to do next," says Philip.

Actually, by the standards of the technology used to create the graphics in, say, *Tron*, that used by the Studio is very modest. Roughly the equivalent to what a small business might use for accounting. "We use, as our main machine, a DEC PDP II which has been adapted by the addition of a special decoder for Naplps standard graphics."

Naplps stands for North Atlantic Presentation Level Protocol Syntax – not exactly catchy. What it is, roughly, is a graphic equivalent of MIDI for music or VHS for video – a standard which allows for a kind of advanced Prestel level of graphic, similar but higher resolution.

One important practical advantage of the system is the way it allows use of a small box called a 'presenter'.

"Once we have finished a commissioned work there are a variety of things we can do with it including producing videos to various formats, slides, stills and so on – we can also use the presenter. The machine can accept an Eprom of the production and then be used as partial computer terminal. We hire one out complete with burnt-in Eprom and then you hook it up to a monitor and it's controlled by a simple push-button to clock between sections."

Philip Bergman, director of Communication Studio

But what's it like for a graphic designer who, after years of training with pencil, pen, paint and paper is confronted with a £20,000 graphics terminal and a light pen?

I spoke to Mark Cornwall who has recently joined the company from the BBC where he worked with its *Paintbox* computer graphic system.

"Although in many ways the same skills you learn with a pencil or a brush are required, you do have to adapt to a new way of thinking. Any individual element of the picture can be treated like a separate picture of its own and so the way you construct a picture, particularly if it isn't a simple representation, is quite different.

"The graphic designers who try to treat the computer screen just like a piece of paper and the light pen like a pencil are the ones who don't really get on with the system."

In many ways the designer is more like an animator. "You always have to think in terms of overlays, not only make things look right statically but to consider the way images flow into one another. The whole process is so flexible, though, that you can try out many alternative ideas in a much shorter space of time."

There is almost a problem with having too many possibilities. "You have to remember that at all times you are commissioned to do a certain job of work by a company and the message mustn't become subordinate to too many tricks and devious techniques."

David Williams, another graphic designer with the Studio, commented further: "Really the considerations we have are the same as any other designer – what colours will look right, what is the end medium going to be and how can the style be best adapted to it."

What of the future for the company? Philip finds a couple of recent developments particularly interesting. "MSX standardisation might provide a motive for us to move down-market and do things for the home sector. In addition, MIDI (the electronic keyboard communication standard) could enable us to produce a complete sound and music production."



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Hardware Review

A step-up

Hardware *Ultradrive* **Price** £79.95 Plus £3.45 P&P **Micro** BBC B (reviewed) and Dragon **Supplier** Ikon Computer Products, Kiln Lake, Laugharne, Carmarthen, Dyfed SA33 4QE

If you can't afford disc drives but find tapes tedious, *Ultradrive* is an alternative worth considering. This cassette drive uses mini cassettes — one-third the size of normal audio cassettes. The trick is that it works very fast indeed. Ikon produced an earlier version intriguingly named *The Hobbit* which cost quite a bit more, but *Ultradrive* is twice as fast.

Each mini-cassette is divided into two "loops" per side when you first format it, and each loop can contain programs or data files. Programs load in a fraction of the time normal tapes require, and what's more you don't have to fiddle about winding through your tape for the start of the program. *Ultradrive* keeps a catalogue at the start of each loop and refers to it each time. It then winds forward to your program and tapes it into the micro. And thereby hangs a tale ... that system of referral is fine on discs, but it can get in the way with cassettes. Sometimes you spend more time listening to the cassette rewind to check the index than it takes to load a program when it finally gets there.

With high-speed access it becomes sensible to keep data files for use with your filing programs. By switching to complex mode *Ultradrive* even allows you to open up five different files at once if necessary. (Only the BBC version offers that facility at present, the Dragon version is still a simple single file system.)

The simple file mode does not eat up precious memory and leaves *Page* at *&E00*, while complex mode takes up some memory space. The machine itself is a neat metal 3½" cube which plugs into the User Port and power outlet while a Rom chip fits inside. (The Dragon version plugs into the cartridge slot). The review version came with temporary manuals and I trust the final versions will be a little more helpful, since the brief instructions I received would possibly puzzle people not familiar with disc filing systems already. A utility tape is provided with several useful little programs.

No one in their right minds would change down from discs to *Ultradrive*, but it offers an affordable step-up for cassette users. The speed and convenience is easily worth the price. Okay, so each tiny data cassette costs about £3, but that matches top quality disc prices.

Dave Watterson

Ratpack

Hardware *RAT (Remote Action Transmitter) Controller* **Micro** Spectrum **Price** £29.95 **Supplier** Cheetah Marketing, 24 Ray Street, London EC1R 3DJ

Sticking a rat in your Spectrum may not sound like a good idea – but when the rodent in question is Cheetah Marketing's RAT (Remote Action Transmitter) joystick, things begin to make more sense.

The RAT does away forever with trailing joystick cables, since it operates by infra-red transmission. A receiver unit plugs into the Spectrum's peripheral port, and the hand unit broadcasts infra-red signals to give the appropriate directions.

The device is compatible with Kempston protocols, so there is already a large library of games which can be used with it, and its controls are also easy to incorporate it into your own Basic programs.

The RAT doesn't look like much to start with – it's constructed of grey plastic which seems to have been chosen for economy rather than looks. The case is long and low and the RAT has a touch-pad instead of a 'stick' arrangement.

The touchpad is as much as a novelty as the infra-red system (a bit like Suncom's Joy Sensor for the Commodore/Atari machines) – it's a flat circular surface which responds to thumb pressure. The Fire control on the RAT works in the same way. The design is such that it's equally easy – or difficult – for left and right-handers to use. Although reaction is almost instantaneous, and there are no moving parts to wear out, a lot of players may be put off the RAT because using it entails learning a whole new playing style.

The RAT needs a nine-volt battery (I can hear it now – "I only missed the high-score because my battery ran out") and the receiver which plugs into the Spectrum has a follow on edge connector for other peripherals such as speech synthesisers.



The effective range seems to be up to 30 feet, though about 12 would be average. What's more, you don't have to be aiming directly at the receiver – there's a wide margin for error.

It's unfortunate that the three games Cheetah has chosen to launch along with the RAT are not particularly good demonstrations of its capabilities. *Perils of Bear George* is a cutesy character game featuring a greedy bear; *Dragonfire* is an adapted Imagic videogame, and *Moonsweeper* is an unremarkable space shoot-'em-up. Remember though, that the RAT is Kempston compatible, so most Spectrum owners will already have many suitable games.

On the whole the RAT – which will soon be available for the Commodore 64 – seems a reasonable buy at £29.95 – if a bit gimmicky.

It will take lots of practice to become as good a RAT handler as you are on conventional joysticks so don't, as the Cheetah adverts suggest, use your old joystick to stir your tea.

The age of Joystick Wrist may be over, but with the RAT we face the disturbing possibility of a nationwide outbreak of Touchpad Thumb.

Chris Jenkins

Letter style

Program *Joystick Art* **Micro** Commodore 64 **Price** £8.98 **Supplier** Innah, 1 Lynton Close, Woodley, Reading, Berks RG5 3SF

Joystick Art is yet another drawing program for the Commodore 64

It doesn't have anything astounding about it but it does have the virtue of providing more or less any option you could ever want.

You can use either the keyboard or joystick to control a drawing cursor, construct lines, draw various sorts of boxes, triangles, rectangles, ellipses, and circles and fill them in. You also have a choice of five different lettering styles and heights to choose from.

A simple manual lists the facilities and shows you how to use the and results in your own programs.

Better than most of the other drawing programs around at the moment. Most of these options have a choice of three styles from which to choose boxes can be opened or closed. With a joystick you hardly need to use the keyboard at all.

Ian Waltham

Parking cones

Program *Smash and Grab* **Price** £8.95 **Micro** BBC B **Supplier** Superior Software Regent House, Skinner Lane, Leeds 7

Any variation of the *Monsters/Killer Gorilla* theme has to be very good indeed to make any impact on the market. In *Smash and Grab* you play the Bank Robber attempting to collect bags of gold falling from a smashed bank window Simple, yes, but not with an agile policeman hot on your trail, ladders to scale and a variety of obstacles (including flying parking cones and mysterious rise-and-fall dustbin lids) out to get you.

The graphics are smart and amusing and so the game is easy to play even on a black and white monitor The instructions, too, are simply written and clearly printed for the younger player. I found the Bank Robber's movements frustratingly slow, especially when compared with the speed of the policeman opponent, although playing with joysticks might be an advantage here

I suspect that prolonged playing would enable you do discern patterns of movement and attack which might make it boring to repeat – but I was not sufficiently interested in the game to get past that stage.

Smash and Grab would appeal to new users unfamiliar with similar games, but it seems to have no radically new inventions to give it the edge over others available But the parking cones might just grab Terry Wogan fans

Carol White

Factory floor

Program *Uncle Claude* **Micro** BBC B **Price** £6.95 **Supplier** Alligata Software, 1 Orange Street, Sheffield S1 4DW

Workers, it's time to strike back! Uncle Claude, the arch-capitalist is planning to withhold his stocks of electrical equipment to increase his profits. Jobs are threatened. It's up to you – Micro Micky – to break into the factory at night and load up the conveyor belt But watch out, Uncle Claude and the corporation are lying in wait to stop you.

It's a long nights work ahead of you. to get through 11 levels of electrical goods, from strip plugs and cassettes all the way up to the top flight products, synthesisers, TV sets, 'cruise missiles???' and finally the BBC Model B's. Twelve of each product must be loaded onto the conveyor belt before you can collect the key to the next level.

The action takes place in four different settings, two of which involve pushing the goods through gaps or a force barrier Also, you can temporarily get Uncle C out of the way by flattering him with his own products as you push them around the factory Keyboard or joystick controls may be used, either way your task is not easy so watch out or you'll soon become an ambulance case

Finally, am I imagining things or could Uncle Claude possibly be related to Uncle Clive? – there's a certain passing resemblance in the picture on the box. More entertaining arcade action from Alligata.

Simon Wilson

Star chart

Program *Astronomer* **Micro** Spectrum 48K **Price** £9.95 **Supplier** CP Software, 2 Glebe Road, Uxbridge Middx UB8 2RD

This program is nicely menu driven with six main options and computes sidereal (star) time, the position of 16 bodies in the Solar System including two comets It animates some of them and plots the night sky for any date, time and place with good accuracy

No clue is given as to the brightness of what prove to be the fainter planets and comets, so the program's starcharts, covering approximately 30° × 20° each, are too sparse of stars (limiting magnitude 4.75) to be of practical use here. But I admire the programmer's dedication in producing these charts covering the whole star sphere An option to link the stars into their constellations is included.

The program does have some shortcomings: from plotting the star Mira too bright, causing a star just touching London's south horizon to hover there for two and a quarter hours, to computing Comet Halley's distance from Earth constantly wrong, to the test sample sky that is four hours adrift from reality

The otherwise excellent 16-page manual compounds the latter error by stating that "Orion is rising in the ESE" when it should be in the SSW for that date and hour Re-entering these again gives the correct view, but only after an 11 minute "Please wait" interlude whilst all 1000 or so stars in the database are recomputed, whether visible or not

This interlude precedes any new night sky view even if changed by one second — itself an unnecessary luxury A

minimum option of one minute would suffice when it is appreciated that the outer planets, for example, don't "move" noticeably over 24 hours. The planets must be computed separately by keying the menu before they can be plotted onto the starcharts. All the data and charts can be committed to the printer.

The program has some commendable ideas and is attractively boxed, but is a little overpriced.

Maurice Gavin

Check-out

Program *Trollie Wallie* **Micro** Commodore 64 **Price** £7.00 **Supplier** Interceptor Micro, Lindon House, The Green, Tadley, Hants.

Interceptor Micro's Wallie is apparently a 'well established' character in games like *Wheelin Wallie* and *Wallie Goes to Rhymeland*.

The last part of this trilogy is *Trollie Wallie* in which Wallie raids the supermarket.

The idea is that you guide Wallie around the store which is chock full of shopping items for Wallie to collect — 40 in fact. Wallie must collect them five at a time only (he can carry no more), take them to the check-out till, and then pay for them.

The supermarket proves to be a maze of wrong turnings and seemingly impassable obstacles and I must admit I've always found supermarkets to be a bit like that too. Solving the game requires both speed and thought as you search for the elusive switches that open barriers, and avoid the usual bizarre collection of weirdies.

Ian Waltham

Skeletal

Program *Frank n Stein* **Micro** Spectrum **Price** £5.95 **Supplier** PSS, 452 Stoney Stanton Road, Coventry CV6 5DG

The first thing that struck me about this game was its similarity to *Manic Miner* and *Jetset Willy*. But I then realised that it is an almost exact likeness of Virgin's *Dr Franky and the Monsters*.

There are two differences between the games from Virgin and PSS — that from PSS has 46 more screens, each of which is more complex than those in Virgin's program, and secondly, the PSS game is good. Very good.

The object is to move around the screen, collecting a series of bones which combine to form a skeleton — this is shown building up as you go at the top right-hand corner of the screen. What you are constructing is a monster, which, when 'activated' (you do this by pulling the switch at the top of each screen) comes to life.

The graphics in the game echo those in *Manic Miner*; the sizes of the various different things being similar. Although this does not allow quite as much detail as there is in, say, *Mugsy*, it means that more can be fitted onto each screen, giving each one a longer 'life' as far as the player is concerned. My review copy enabled me to start in any of the first 25 screens, which appear to get more difficult as you progress.

This game is for me the best release yet from PSS — better than both *Blade Alley* and *Les Flics*.

David Lester

Space base

Program *Vegan Attack* **Micro** Spectrum **Price** £1.99 **Supplier** Atlantis, 19 Prebend Street, London N1 8PF

This is the first release I have seen from the budget price software company, Atlantis which is selling games at just £1.99 a time.

Despite the arcade-action tone of the title, this is just another version of *Star Trek*. My only experience of this age-old computer game is *Star Trek* from R and R, which I quite enjoyed. Although the game is, it must be said, slightly dated now, if you engross yourself in it to the same extent as you might in, say, *Jetset Willy*, you will almost certainly get as much enjoyment out of it.

In case you do not know what the game is about, here is a rough idea: the galaxy (or your area of it, at any rate) has been invaded (usually by Klingons, but in Vegan Attack, it is, not surprisingly, by Vegans). These dastardly aliens have space ships and space stations, as do you, the Captain of the USS Andromeda (the USS Enterprise in the original version). You give the computer commands and direct your ship and *Star Bases* (space stations) as best you can to try and defeat the invaders.

This version from Atlantis has nothing especially new, except for a few nice graphics now and then. It is written in Basic, which does not usually matter with a game of that nature.

If you like strategy games with a slight war-like slant to them, and do not already own a version of *Star Trek*, then you would be hard-pressed to do better than this one.

David Lester

Visible mine

Program *Mined-out* **Micro** Oric **Price** £6.95 **Supplier** Quicksilva, PO Box 6, Wimborne, Dorset

The pun in the title of Quicksilva's *Mined-out* reveals the idea of the game.

The screen depicts a minefield, which you must cross being careful to avoid the invisible mines. As you go you leave a trail of 'string' — of which there is a limited amount — and a line at the top of the screen indicates how many mines are adjacent to the square you occupy. Each time you successfully cross the minefield you go up a level.

After Level 1 things hot-up. You can now start rescuing maidens for extra points (what about all the gents in distress?) and, appearing randomly across the screen, is the minelayer. This character is actually helpful since it replaces invisible mines with visible ones. Of course with each new level there are more mines layed and after Level 4 a spider-like bug starts to follow you around.

This game is neither a frantic chase nor a tour de force of co-ordination so at first it seems quite easy. But to advance through many levels you inevitably end up taking some risks and stepping on a mine. Exit stage left, start again.

I found there was not enough variety to keep playing, game after game.

Vic Fielder

Trophy

Program *Room Lord* **Micro** Commodore 64 **Price** £6.95 **Supplier** Paramount, 67 Bishopton Lane, Stockton-on-Tees, Cleveland TS18 1PU

Room Lord is a dodge and search game in which you retrieve precious heirlooms from a ghost-ridden mansion just chock full of demons, cyclopses, chinese dragons and the rest.

You have to make your way room by room through a total of 16 screens, grabbing the goodies and making sure nothing else grabs you.

Like *Miner*, from which so many games now seem to derive, the way to successfully retrieve each item is often not immediately obvious.

Aside from getting the monsters, you also have to find the exit and all this within a time limit. Make it through all the rooms, including a special one on the last level you may only enter on completing the others, and you are awarded a display of a golden trophy.

If you haven't got tired of this type of game this it could be worth a look.

Ian Waltham

Blitzed

Program *Falcon Patrol II* **Micro** Commodore 64 **Price** £6.95 **Supplier** Virgin Games, 2-4 Vernon Yard, Portobello Road, London W11 2DX

Falcon Patrol was probably the most successful and best of all Virgin's early software issues. Now here comes the sequel FPII and it's more of the same

For those who never saw the original, *Falcon Patrol* was a fairly straightforward shoot baddies and refuel your plane without getting yourself shot game, but with an excellent 3D landscape of blitzed buildings and incredible sound effects.

In version one you were up against nasty turbo fighters. In this new one the baddies are missile-equipped helicopters.

Aside from the helicopters — which dodge all over the place — there are flak batteries taking pot shots from the ground and radar jammers that occasionally mean you are flying blind not knowing where the next attack is coming from. In FPII not only can you shoot air-to-air, but you can — and must — also attack ground targets using air-to-ground missiles. If you liked number one then you'll like number two — the formula isn't exhausted yet.

Ian Waltham

Ice caves

Program *Xanadu Cottage* and *Ebony Tower* **Price** £6.95 **Micro** BBC B **Supplier** Alligata Software Ltd, 1 Orange Street, Sheffield S1 4DW.

The new twin-adventure package from Alligata features a double helping of mystery in the form of *Ebony Tower* and *Xanadu Cottage*.

Both are fairly standard adventures, with an on-screen description of the various locations – no graphics unfortunately. A glance at the vocabularly accepted in the two adventures, which comprises a section in the rather brief instructions, reveals the standard directional commands and facilities to save the present position for reloading later, plus a range of additional instructions from the obviously useful (Kill, Pray, etc) to the 'presumably useful' – when do you Knie?

The games cover two favourite adventure themes *Xanadu Cottage* is a treasure hunt in the forests, ice caves, mazes, tunnels and passages – plus, according to the instructions, factory and leisure dome (which I have yet to discover) – surrounding the cottage. *Ebony Tower*, on the other hand, is a quest to unravel the secrets of an island kingdom, or should that be 'dragondom', in which the usual types of magical characters (dwarfs, hobgoblins, etc) are encountered before the final confrontation with the dragon which inhabits the Ebony tower.

Although I did not have time to penetrate very far into either game, if they continue in the manner to which they began, both should provide a very satisfactory balance between those attributes of the adventure game, problems and frustrations. The locations are well constructed and the puzzles sufficiently devious to occupy both one's logic circuits and imagination.

Simon Wilson

Hyperdrive

Program *Galaxy Raiders* **Price** £6.95 **Micro** BBC B **Supplier** Visions, 1 Felgate Mews, Studland Street, London W6

Is the world ready for yet another version of *Star Trek*? It was probably the first long game most of us typed in from magazine listings. Still, Visions have had Ian Valentine produce another version of the arcade/strategy game,

You captain a space craft equipped with phasors, missiles, hyperdrive and target computer. A galactic map shows all known space and indicates the position of starbases and enemy craft. You can refuel at starbases but have to protect them from enemy attack.

Hyperdrive to the sector in danger, then use your computer on the forward view to track down and shoot the bad guys. Damage reports are available and you must watch your energy levels

This is a very good implementation and getting the hang of it is quite tricky. Your moves have to be subtle and wary of enemy strategies. If you are successful you move up through the ranks from novice to star commander – but the task gets harder at each level.

The irony is that Gene Roddenberry created the *Star Trek* TV series to spread a message of peaceful co-existence and now it has become a shoot-first-ask-later game

Dave Watterson



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By definition

Ian Logan shows you how to produce user-defined graphics characters on your QL

The QL and the Spectrum are meant to be complementary machines and are not intended to compete with each other

Hence, the ability to define one's own graphics characteristics, which is so much a feature of the Spectrum, was purposely left out of the QL's SuperBasic

However, within certain limits, it is still relatively easy to create user-defined graphics (UDG's) on the QL. All that is required is an understanding of how the standard characters are produced.

The character set for the characters from Space to copyright symbol (addresses 20H to 7FH, 32 to 127 dec) is to be found in the QL's read-only memory (Rom) However, its base address varies from the Rom version to another and it is perhaps best to find this address by looking into a channel header block. For example, if the standard channels 0,1 and 2 have not been distributed, the base address of the first character sets is given by

PRINT PEEK-L (167728)

Note, there is normally a separate character set for the characters 80H to BFH (128 to 191 dec); and this set's base address is found by using

PRINT PEEK-L (167736)

Each character set has eleven header bytes. These are. 1) The character code below the starting character, ie, if the first character is to be character 20H (32 dec, then this byte is 1FH (31 dec)

2) The number of character forms held in the current set, ie, for characters 20H to 7FH (32 to 127 dec) this byte is 60H (96 dec).

3-11) Nine bytes to hold the form of a 'default character', ie, normally the QL uses "542854285428542854H" which gives a cross-hatch character

The main body of the character set holds the character forms of all the characters Each character has its form held in nine consecutive bytes, but, in each byte, only bits 6,5,4,3 and 2 are used

As an example consider the form for the character '7' The bytes are "007C0408102040400OH", which can be represented as:

```
   .                 00H, 0   dec
 1 1 1 1 1           7CH, 124 dec
         1           04H, 4   dec
   . . 1 .           08H, 8   dec
   . 1               10H, 16  dec
 . 1                 20H, 32  dec
 1       .           40H, 64  dec
 1 .                 40H, 128 dec
                     00H, 0   dec
```

Now try the accompanying QL UDG program made up of the following four procedures.

Procedure udg. This is called just once. The procedure identifies the 'old' character set base address and copies over the whole of the set into the resident procedure area. Then, procedures 'newset' and 'defchars' are called.

Procedure defchars This is a simple procedure this allows you to define your own characters The new character is displayed as it is created. This procedure can be called independently, as required.

Procedures newset and oldset. These procedures allow you to 'toggle', if wished, from the oldset to the newset, or vice-versa.

```
100 DEFine PROCedure udg
110 chan1font=167722
120 oldbase=PEEK L(chan1font)
130 newbase=RESPR(875)
140 FOR d=0 TO 875 STEP 4
150 POKE L newbase+d.PEEK L(oldbase+d)
160 END FOR d
170 newset
180 defchars
190 END DEFine udg
200 REMark ....................
210 DEFine PROCedure defchars
220 CLS
230 REPeat loop
240 PRINT "Select the character to be re-defined"
    \"by entering its code (32-127)
."\"Use anything else to quit.
250 INPUT \"Character code? ";a;
260 PRINT '    Character  ";CHR$(a);">"
270 IF a<32 OR a>127 THEN EXIT loop
280 PRINT\"Now enter the 9 values (0-255) for"
    "this character"
290 charbase=newbase+ 0+(a-32)*9
300 PRINT "          Old   New   Character'
510 FOR d=1 TO 9
320 PRINT "Line ':d:'     ";PEEK(charbase+d).
330 INPUT b:
340 IF b<0 OR b>255 THEN PRINT \: EXIT d
350 POKE charbase+d,b
360 PRINT "       ':CHR$(a):" '
370 END FOR d
380 PRINT "Another character? (y/n)  :
390 INPUT a$
400 IF a$=="y' THEN CLS: NEXT loop
410 EXIT loop
420 END REPeat loop
430 END DEFine defchars
440 REMark ............ .......
450 DEFine PROCedure newset
460 POKE_L chan1font.newbase
470 END DEFine newset
480 REMark ..... ........... .
490 DEFine PROCedure oldset
500 POKE L chan1font.oldbase
510 END DEFine oldset
520 REMark ................ ...
```

Testing, testing . . .

A simple word test for young children by J Blow

Word Test is a simple program for children of primary school age. It was written for my six year-old son who wanted to copy words from his school reading books and found concentration a problem.

The program runs from Line 1200, the start of the main loop, sets up the required variables and Gosubs to line 1135.

Line 1145 is the screen introduction. The child's name is entered as P$ in Line 1150 and printed at the top of the screen. A keypress is then awaited in Line 1190. This pause allows time for pencil and paper to be found.

After the keypress, the first word in A$ is printed, a prompt is given and the timer is started and displayed. The child then writes the word down on a sheet of paper and when s/he has finished the 'Y' key is pressed, the time taken to write down the word is recorded, and the next word is displayed.

If the time taken for the child to write down the word reaches 100 seconds before the Y-key is pressed, then the program displays "Time Up" and an audible tone is heard. The next word is then printed.

At the end of the ten words a 'results' screen is printed showing the ten words and the times taken to write them out. A print-out of this screen can be made.

If you want to change the words stored in A$ — the words to be tested — just type *Run* and the routine at Line 1420 to enter new data is called.

The words are stored in A$ with a space between each word, eg, *A$ = "Word1 Word2 Word3 ... Word10"*. Each word should not be more than nine letters long and must end in a space. Rem statements in the program show the main routines for those who may wish to modify and improve the program for their own use.

The large-print routine is borrowed from the excellent *Horizon* demo tape. To save the 300 bytes of machine code required for this program, load any program on side 2 of the *Horizon* tape. Then stop the Basic program using Caps and Break and type in, as a direct command, *Save "mc" 32256, 300*. Save this machine-code directly after the loader program in Fig 1. Then type in the main program (Fig 2) and save it using *Goto 1455*.

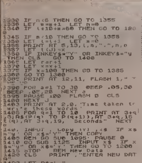
Run the program and enter your ten chosen words and then the test can begin.

Fig 1.

```
   1 CLEAR 32255  LOAD "mc"CODE
32256,300  LOAD "wordtest 1"
   2 STOP
   3 SAVE "loader" LINE 1
   4 SAVE "mc"CODE 32256,300
```

Fig 2.

```
   1 REM START PROG AT 1200
  10 REM Initialise new words
1001 LET a$="  "  GO TO 1420
1015 REM Large Print
1020 LET xy=(255-8*xs*LEN p$)/2
1025 LET i=23306
1030 POKE i,xy  POKE i+1,yy  POK
E i+2,xs  POKE i+3,ys  POKE i+4,
0
1035 LET i=i+4
1040 LET w=LEN p$
1045 FOR n=1 TO w
1050 POKE i+n,CODE p$(n)
1055 NEXT n
1060 POKE i+w+1,255
1065 LET w=USR 32256  RETURN
1070 BEEP 1,1
1075 REM Subscripts
1080 FLASH 0  INK 0  LET p$="Pre
ss any key to continue"
1085 LET xs=1  LET ys=3  LET yy=
140
1090 GO SUB 1020  RETURN
1095 FLASH 0  INK 0  LET p$="Pre
ss SPACE key when ready"
1100 LET xs=1  LET ys=3  LET yy=
166
1105 GO SUB 1020  RETURN
1110 FLASH 0  INK 0  LET p$="Hav
e you written the word"
1115 LET xs=1  LET ys=3  LET yy=
165
1120 GO SUB 1020  RETURN
1125 FLASH 0  INK 0  LET p$="  D
o you want another go"
1130 LET xs=1  LET ys=3  LET yy=
150
1135 GO SUB 1020  RETURN
1140 REM Screen Introduction
1145 OVER 0  PAPER 7  BORDER 2
FLASH 0  INVERSE 0  BRIGHT 0  IN
K 1  CLS
1150 LET p$="Philip Blow."
1155 LET yy=5  LET xs=2  LET ys=
3
1160 GO SUB 1020
1165 LET yy=70  LET p$="Word Tes
t"  FLASH 0  INK 2
1170 LET xs=3  LET ys=3
1175 GO SUB 1020
1180 IF x=0 THEN GO SUB 1080
1185 IF x=1 THEN GO SUB 1125
1190 PAUSE 0  GO TO 1235
1195 REM Main Loop
1200 DIM P(100)  DIM t(10)  LET
S=1  LET x=0
1205 LET g=0
1210 FOR n=1 TO LEN A$+1  LET P(
n)=LEN A$  NEXT n
1215 FOR F=1 TO (LEN A$)-1
1220 IF A$(F)=" " THEN LET P(S)=
F  LET S=S+1
1225 NEXT F
1230 GO SUB 1145  PAUSE 300
1235 CLS   FOR J=1 TO 10
1240 LET g=g+1
1245 LET P$=A$(P(g) TO P(g+1))
1250 LET yy=60  LET xs=3  LET ys
=3
1255 GO SUB 1020
1260 GO SUB 1110
1265 REM TIMER
1270 LET x=0
1275 LET x=INT ...
1280 LET l=0  LET e=0  LET n=0
LET o=0
1285 LET r=0  LET t=0  LET s=0
1290 POKE 23674,0  POKE 23673,0
 POKE 23672,0
1295 DEF FN u()=INT ((65536*PEEK
 23674+256*PEEK 23673+PEEK 23672
)/50)
1300 LET ...  LET  =FN u()
1305 LET t=(s+t+ABS (s-t))/2
1310 IF t<r THEN GO TO 1300
1315 LET o=o+1
1320 IF o<10 THEN GO TO 1355
1325 LET n=n+1  LET o=0
```



```
1330 IF n<6 THEN GO TO 1355
1335 LET m=m+1: LET n=0
1340 IF l*10+m=60 THEN GO TO 1280
1345 IF m<10 THEN GO TO 1355
1350 LET l=l+1: LET m=0
1355 PRINT AT 5,13,l,m,".",n,o
1357 LET t(J)=X
1360 IF INKEY$="Y" OR INKEY$="y" THEN CLS : GO TO 1400
1365 LET r=r+1
1370 LET x=x+1
1375 IF x=100 THEN GO TO 1385
1380 GO TO 1300
1385 PRINT AT 12,11, FLASH 1," TIME UP"
1390 FOR a=1 TO 30: BEEP .05,30: BEEP .05,20: NEXT a
1395 PAUSE 100: FLASH 0: CLS
1400 NEXT J
1403 PRINT AT 2,0,"Time taken to write these words"
1405 FOR q=1 TO 10: PRINT AT 3+q,5;A$(P(q) TO P(q+1)),AT 3+q,15;t(q),AT 3+q,19,"Seconds": NEXT q
140, INPUT , Lopy (y) ,x$: IF x$="y" OR x$="Y" THEN COPY
1408 REM GO SUB 1095: PAUSE 0
1410 GO SUB 1125: INPUT x$: IF x$="y" OR x$="Y" THEN GO TO 1200
1415 STOP : REM New Data
1420 CLS : PRINT ,"ENTER NEW DATA"
1423 LET A$=" "
1424 FOR h=1 TO 10
1425 INPUT ," Enter new word and end with a        SPACE ",b$
1430 LET A$=A$+B$
1435 BEEP 1,1
1440 IF INKEY$=" " THEN STOP
1445 NEXT h: PRINT ,"10 words entered": PAUSE 100: GO TO 1005
1450 STOP
1455 SAVE "wordtest 1" LINE 1200
1500 STOP
```

Time taken to write these words

still	18	Seconds
back	14	Seconds
feel	21	Seconds
stuck	42	Seconds
tried	76	Seconds
over	17	Seconds
there	39	Seconds
Fulmo	22	Seconds
rope	14	Seconds
feather	65	Seconds

00.23

feather

Have you written the word?

On the construction site

High-resolution character design by B P Hatton

Although the Dragon does not have a direct high-resolution text facility, characters can be drawn fairly easily from a prepared list.

The program below is designed to simplify construction and relative positioning of characters or even whole words.

Use of the keyboard for the drawing operation gives much better control than a joystick.

After each point, the condensed string (up to 255 characters) for your design can be listed on the text screen ready to incorporate directly in a program.

Program notes

10-80	Introduction
100-110	Create string space
130-240	Instructions
250	Rom continue routine
270	Initialise variables
290-310	Flashing cursor
320	Set last point
330-580	Keyboard input
560-570	Toggle cursor on/off
600-610	Condense string

```
10 REM*******************
20 REM*                 *
30 REM*HIGH  RESOLUTION*
40 REM*   CHARACTERS    *
50 REM*    (C) 1984     *
60 REM*  BRIAN HATTON   *
70 REM*                 *
80 REM*******************
90 REM*CHARACTER STRING*
100 CLEAR 1000
110 DIM D$(1000)
120 REM*INSTRUCTIONS*
130 CLS
140 PRINT@40 "character
design"
150 PRINT@72,"ON PRESSIN
G ANY KEY TO  LEAVE THIS
 PAGE ,A SMALL CURSOR WI
LL APPEAR CENTRE SCREEN
"
160 PRINT@160,"press-arr
ows TO DRAW OR MOVE "
170 PRINT@197,"-l/r+up/d
own DIAGONALS "
180 PRINT@229,"-c TO CAN
CEL DIAGONALS "
190 PRINT@261,"-o TO MOV
E AND NOT DRAW "
200 PRINT@293 '-o TO REG
AIN DRAW '
210 PRINT@325,"-e TO EXA
MINE STRING "
220 PRINT@357,"-k TO CON
TINUE STRING "
230 PRINT@389,"-i FOR IN
STRUCTIONS "
240 PRINT@421,"-s TO RES
TART "
250 PRINT@456,"any key t
o start' EXEC 41194
260 REM*SET VARIABLES*
270 PMODE4 PCLS1 SCREEN1
,0 A=125 E=96 P=1 D$=""
[illegible] D=0 Z=0 CLS X=0
280 REM*KEYBOARD DRAW*
290 PSET(A,B,P)
300 PSET(A,B,Q)
310 I$=INKEY$ IF I$="" T
HEN 290
320 IF X=1 THEN PSET(S,T
,0) X=0
330 IF I$="E" THEN CLS P
RINT"STRING IS ","BM 128
, 96 ",D$
340 IF I$="S" THEN 270
350 IF I$="I" THEN 130
360 IF I$="K" THEN PMODE
4 SCREEN1 0:GOTO 290
370 IF I$="C" THEN Z=0 G
OTO 290
380 IF I$="L" THEN Z=1 G
OTO 290
390 IF I$="R" THEN Z=2 G
OTO 290
400 IF I$="↑" AND D=0 AN
D Z=0 THEN D$=D$+"U1" B=
B-1 GOTO 600
410 IF I$=CHR$(10) AND D
=0 AND Z=0 THEN D$=D$+"D
1' B=B+1 GOTO 600
420 IF I$=CHR$(9) AND D=
0 THEN D$=D$+"R1" A=A+1
GOTO 600
430 IF I$=CHR$(8) AND D=
0 THEN D$=D$+"L1" A=A-1
GOTO 600
440 IF I$="↑" AND D=0 AN
D Z=2 THEN D$=D$+'E1" A=
A+1 B=B-1 GOTO 600
450 IF I$=CHR$(10) AND D
=0 AND Z=2 THEN D$=D$+"F
1" A=A+1 B=B+1 GOTO 600
460 IF I$=CHR$(10) AND D
=0 AND Z=1 THEN D$=D$+"G
1' A=A-1 B=B+1 GOTO 600
470 IF I$="↑" AND D=0 AN
D Z=1 THEN D$=D$+"H1' A=
A-1 B=B-1 GOTO 600
480 IF I$='↑" AND D=1 AN
D Z=0 THEN B=B-1 GOTO 29
0
490 IF I$=CHR$(10) AND D
=1 AND Z=0 THEN B=B+1 GO
TO 290
500 IF I$=CHR$(9) AND D=
1 THEN A=A+1 GOTO 290
510 IF I$=CHR$(8) AND D=
1 THEN A=A-1 GOTO 290
520 IF I$="↑' AND D=1 AN
D Z=2 THEN A=A+1 B=B-1 G
OTO 290
530 IF I$=CHR$(10) AND D
=1 AND Z=2 THEN A=A+1 B=
B+1 GOTO 290
540 IF I$=CHR$(10) AND D
=1 AND Z=1 THEN A=A-1 B=
B+1 GOTO 290
550 IF I$="↑" AND D=1 AN
D Z=1 THEN A=A-1 B=B-1 G
OTO 290
560 IF I$="O" AND P=1 TH
EN P=0 Q=1 D$=D$+' ," D=1
 S=A T=B X=1 GOTO 290
570 IF I$="O" AND P=0 TH
EN P=1 [illegible] D$=D$+"BM"+ST
R$(A)+ '+STR$(B)+ ','" D=
0 GOTO 290
580 GOTO 290
590 REM*REDUCE STRING*
600 IF LEN(D$)<4 THEN 62
0
610 IF MID$(D$,LEN(D$)-1
,1)=MID$(D$,LEN(D$)-3,1)
 THEN D$=LEFT$(D$,LEN(D$
)-3)+RIGHT$(STR$(VAL(MID
$(D$,LEN(D$)-2,1))+1),1)
620 GOTO 290
```



...LONG LIVE
Eureka!

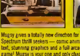


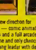
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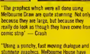
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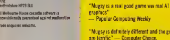
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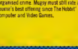
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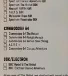
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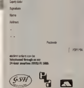
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Painting by numbers

Computer Art, a sophisticated graphics drawing program by ***Michael Griffin***

This program allows you to create complicated pictures on screen using a simple single-key system of instructions and either a joystick or the cursor keys.

As well as facilities like *Line* and *Arc* the program has a number of different area fills giving a variety of effects and also a facility to add text to the picture. The program will be published in two parts.

Going through *Computer Art*'s commands, one by one:

Rubber banding. Accessed by pressing function key 0. This temporarily draws a line from the current cross position to the co-ordinates of a point called 'Point', it then self-erases.

Move Point. Accessed by pressing function key 1. This changes the co-ordinates of *Point* to be identical with those of the current cross position. This function is accompanied by a warning bleep.

Vertical line. Accessed by pressing function key 2. This draws a vertical line from *Point* up or down to the vertical value of the cross.

Horizontal line. Accessed by pressing function key 3. This draws a horizontal line from *Point* left or right to the horizontal value of the cross.

Draw line. Accessed by pressing function key 4. This draws a line from *Point* to the cross.

Draw and move. Accessed by pressing function key 5. This draws a line from *Point* to the cross and resets *Point*'s co-ordinates to be that of the cross. Accompanied by a warning bleep.

Rectangle. Accessed by pressing function key 6. This draws a rectangle from *Point* to the cross.

Elipse. Accessed by pressing function key 7. This draws an ellipse (or circle) with its centre at *Point* and with radii the respective differences between the horizontal and vertical co-ordinates of *Point* and the cross, ie, the white horizontal and vertical lines in *Rubber band* mode.

Place text. Accessed by pressing function key 8. This allows text to be typed in at the current cross position.

Place text. Accessed by pressing function key 8. This allows text to be typed in at the current cross position.

Air brush. Accessed by pressing function key 9. This creates a stippled effect by allotting a number of dots around the position of the cross.

The second and concluding part of *Computer Art* will be printed next week.

DISH DIAMETER=19m STAGE 1 LENGTH=28m
ENGINE DIAM'T= 7m STAGE 2 LENGTH=15m
OVERAL WIDTH =24m OVERAL LENGTH=35m

REGISTRATION NO.
NASA 46117/2

TYPE DESIGNATION
PLANETARY PROBE

MACDONNELL DOUGLAS

```
10 REM ***** COMPUTER ART PROGRAM *****
20 REM ***** BY MIKE GRIFFIN 1984 *****
30 *TV255
40 MODE 1
50 ON ERROR VDU1,15,3 GOTO110
60 PROCASSEMBLE
70 PROCKEYS
80 PRINT"HIT RETURN TO START"
90 A%=GET S%=TRUE J%=0
100 CLS
110 PROCCROSS
120 REPEAT
130 PROCRUBBER
140 PROCCROSS PROCSTIX PROCCROSS
150 IF INKEY(-33) R%=TRUE ELSE R%=FALSE
160 PROCRUBBER
170 IF INKEY(-114) PROCPOINT
180 IF INKEY(-115) PROCVLINE
190 IF INKEY(-116) PROCHLINE
200 IF INKEY(-21) PROCLINE
210 IF INKEY(-117) PROCFLINE
220 IF INKEY(-118) PROCBOX
230 IF INKEY(-23) PROCCIRCLE
240 IF INKEY(-119) PROCTEXT
250 IF INKEY(-97) VDU7 S%=S%*-1
260 IF INKEY(-1) PROCDATA
270 IF INKEY(-90) PROCDELETE
280 IF INKEY(-49) J%=0 PROCFILL
290 IF INKEY(-74) PROCPT2
300 IF INKEY(-120) PROCBRUSH
310 IF INKEY(-106) PROCCHOICE
320 IF INKEY(-50) J%=1 PROCFILL
330 IF INKEY(-18) J%=2 PROCFILL
340 IF INKEY(-19) J%=3 PROCFILL
350 IF INKEY(-2) PROCARC
360 IF INKEY(-53) PROCGRID
370 IF INKEY(-37) PROCREMOVEGRID
380 UNTIL FALSE
390 END
400 DEFPROCDUMP
410 *FX5 1
420 VDU2,1,8
430FORY%=996TO-12STEP-28:FORX%=0TO1279STEP4 !XLO=X%+Y%*6
10000 ?COUNT?=7 CALL ne_byte NEXT:VDU1,10 NEXT
440VDU1,15,3
450ENDPROC
460 DEFPROCCROSS
470 GCOL3,1
480 MOVE X%,0 PLOT21,X% 1023 MOVE0,Y%:PLOT21,1229,Y%
490 ENDPROC
500 DEFPROCSTIX
510 IF S%=TRUE X%=1280-ADVAL1DIV50 Y%=ADVAL2DIV64 ENDPROC
520 IF INKEY(-58) Y%=Y%+4
530 IF INKEY(-42) Y%=Y%-4
540 IF INKEY(-122) X%=X%+4
550 IF INKEY(-26) X%=X%-4
560 ENDPROC
570 DEFPROCPOINT
580 VDU7 V%=X% W%=Y%
590 ENDPROC
600 DEFPROCRUBBER
```

continued over the page ▸

```
610 IF R%=TRUE GCOL3,3 MOVEV%,W% DRAWX%,Y% MOVEV%,Y%:
DRAWV%,W% DRAWX%,W% PLOT6
620 ENDPROC
630 DEFPROCVLINE
640 PROCCROSS
650 GCOL0,2
660 MOVEV%,W% DRAWV%,Y%
670 PROCCROSS
680 ENDPROC
690 DEFPROCHLINE
700 PROCCROSS
710 GCOL0,2
720 MOVEV%,W%:DRAWX%,W%
730 PROCCROSS
740 ENDPROC
750 DEFPROCLINE
760 PROCCROSS
770 GCOL0,2
780 MOVEV%,W%:DRAWX%,Y%
790 PROCCROSS
800 ENDPROC
810 DEFPROCFLINE
820 PROCCROSS
830 GCOL0,2
840 MOVEV%,W%:DRAWX%,Y% PROCPOINT
850 PROCCROSS
860 ENDPROC
870 DEFPROCBOX
880 PROCCROSS
890 GCOL0,2
900 MOVEV%,W% DRAWV%,Y%:DRAWX%,Y% DRAWX%,W% DRAWV%,W%
910 PROCCROSS
920 ENDPROC
930 DEFPROCCIRCLE
960 MOVEV%,Y%
970 FORA=0TO7STEP0.1 DRAW V%+SIN(A)*(X%-V%),
W%+COS(A)*(Y%-W%) NEXT:980 PROCCROSS
990 ENDPROC
1000 DEFPROCTEXT
1010 PROCCROSS
1020 VDU5 GCOL0 2
1030 MOVE X%,Y%
1040 INPUT     A$
1050 VDU4 PROCCROSS
1060 ENDPROC
1070 DEFPROCDATA
1080 GCOL3 3
1090 VDU5:MOVE0 100 PRINT"V=";V%;" W=";W%;" X=";X%;" Y=
";Y% " (V-X)=";(V%-X%); (W-Y)= ;(W%-Y%)
1100 VDU5:MOVE0,100 PRINT"V=";V%;" W=";W%;" X=";X%; Y=
;Y%" (V-X)=";(V%-X%);"
(W-Y)=";(W%-Y%)
1110 ENDPROC
1120 DEFPROCDELETE
1130 PROCCROSS
1140 GCOL0,0
1150 MOVE V%,W%:MOVE C%,D%:PLOT85,X%,Y%
1160 PROCCROSS
1170 ENDPROC
1180 DEFPROCPT2
1190 C%=X%:D%=Y%:VDU7
1200 ENDPROC
1210 DEFPROCBRUSH
1220 PROCCROSS
1230 GCOL0,2
1240 FORA%=0TO5 PLOT69,W%+20-RND(40),Y%+20-RND(40) NEXT
1250 PROCCROSS
1260 ENDPROC
```


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33

Just a memory lapse

Keith Eyeions *explains the mysteries of Rom/Ram overlays and how more of the basic user memory can be used*

Most new Commodore 64 owners get a bit of a shock when they switch on their computer and discover that the "elephantine" 64K of RAM has somehow diminished to 38K of Basic user memory. Consequently, one of the things that puzzles people most is what has happened to the other 26K. Rest assured, that memory is still there, but what is it doing? It is not, as the Oric Atmos advert says used up producing high resolution graphics. The sad fact is that in ordinary Basic mode, 20K of it is doing absolutely nothing!

To understand why, we have to look at the 6510, the central microprocessor in the Commodore 64. As assembly language users will know, the addresses for such instructions as LDA, JMP, JSR, etc, will only go up to 65535. In short, the Commodore 64 can only use 64K of memory.

Unfortunately, as well as 64K RAM, the Commodore 64 has 20K of ROM, 16K of which is necessary when Basic is being used. To solve this problem, the machine uses ROM/RAM overlays. This means that some areas of memory can either be occupied by RAM or ROM. When ROM is needed it is overlaid over the top of a block of RAM the same size. This block of RAM is hidden, and cannot be addressed or used. Unfortunately, in normal Basic mode, 16K of ROM is required, and so 16K of RAM becomes "hidden". A further 4K of RAM becomes isolated from the main block of user memory and cannot be used by Basic.

Below is a simple memory map showing the areas where there are ROM/RAM overlays.

HEX		DECIMAL
FFFF	KERNAL ROM	65535
F000	OR	61440
E000	16K RAM	57344
D000	CHARACTER ROM/ I/O RAM	53248
C000	4K USER RAM	49152
B000	BASIC ROM OR 8K RAM	45056
A000		40960
9000	38K	36864
8000		32768
7000	BASIC	28672
6000		24576
5000	USER	20480
4000		16384
3000	RAM	12288
2000		08192
1000		04096
0800		02048
0000	SCRN MEM & MACHINE PNTRS	00000

From $0800 to $9FFF is the main block of user memory that can be used for Basic programs, etc.

From $A000 to $BFFF is usually the Basic ROM. This can be switched out when using machine code so that the RAM underneath may be used instead. It cannot be switched out in Basic, because it is the part of memory that tells the microprocessor what Basic instructions means.

From $C000 to $CFFF is a 4K block of RAM. Unfortunately, that can only be used by machine code programs because it is isolated from the main block of RAM ($0800-$9FFF) that is used for Basic programs.

From $D000 to $DFFF is the input/output RAM, which contains the colour memory, and the SID and VIC-II chips' registers. The character ROM also resides here, but is normally switched out. It is only ever switched in when it is being copied to RAM by the user to make a user defined character set.

Finally, from $E000 to the end of memory at $FFFF is the Kernal ROM. It is impractical to switch this out, because in most cases even machine code uses Kernal subroutines.

To demonstrate the presence of these ROM areas, try *Poking* 40960 (the start of the Basic ROM) with any number from 0-255, and then type *Print Peek(40960)*. Since you cannot *Poke* into ROM, it will always return the number 148.

The location which determines whether a block of memory is ROM or RAM is 0001. Only the first three bits are used for this purpose, as shown below.

LOCATION 0001

BIT	NAME	BLOCK	MEMORY IF BIT = 1
0	LORAM	$A000-$BFFF	BASIC ROM
1	CHAREN	$D000-$DFFF	INPUT/OUTPUT RAM
2	HIRAM	$E000-$FFFF	KERNAL ROM

If you type *Poke1,Peek(1)AND254* this sets bit 0 to 0 and switches out the basic ROM, revealing the RAM. Unfortunately, as this is the basic ROM, which the system requires to use Basic, the machine crashes and does a restore.

So, to look at the hidden RAM under the basic ROM, machine code is needed. Below is a small program which contains a small machine code routine. This switches out the basic ROM, and finds the number that you tried to *Poke* in earlier.

This was, in fact, *Poked* into the hidden RAM, although you did not know it, because when you *Peeked* 40960 you got the unchangeable number from the ROM. Finally the routine stores the number at 50030 where it can be retrieved by the basic program and switches back the ROM before returning to the basic program.

```
10 DATA169,254,45 1,0,141,1,0,173,0,160 141 110,195
   165 1
20 DATA13,1,0 141 1,0,96
30 FOR A = 50000 TO 50023:REM READ M/C INTO
   MEMORY
40 READD:POKEA,D:NEXT
45 SYS 50000:REM GO TO MACHINE CODE
   SUBROUTINE
50 N=PEEK(50030):REM GET NUMBER STORED BY
   MACHINE CODE
60 PRINT"THE CONTENTS OF RAM LOCATION 40960
   IS" N
```

Simply *Run* the program and it will find the contents of RAM location 40960. Try *Poking* another number into 40960. Again if you *Peek* 40960 you will get 148 but if you *Run* the program it will retrieve your number from the hidden RAM.

For machine code users, here is a disassembly of the routine used in the program with a description of what each line does.

Machine code routine disassembly

```
C350 LDA# $FE
C352 AND $0001
C355 STA $0001
C358 LDA $A000
C35B STA $C36E
C35E LDA #01
C361 ORA $0001
C364 STA $0001
C367 RTS
```

Instructions $C350 to $C355 are the equivalent of *Poke,Peek(1)AND254*. They make 0 of location 1, a 0. This switches out the basic ROM. Instructions $C358 to $C35B find the contents of the RAM location $A000(40960) and store it in $C36E(50030) where it can be found by the basic program. Instructions $C35E to the end switch the basic ROM back in by doing the machine code equivalent of *Poke1,Peek(1)OR1*, and then return back to the basic program.

For people using only Basic, hidden RAM is useless. As you have seen, switching out the ROM causes the system to crash. For machine code users it is very useful for several reasons. By switching out the basic ROM ($A000-BFFF) using a routine similar to my one you get 50K of continuous RAM from $0800 to $CFFF (2054 to 53247). This is used in large programs such as *Manic Miner*.

It is harder to make use of the RAM hidden under the Kernal ROM, because most machine code programs make use of Kernal subroutines located in the block from $E000 to $FFFF, (57344 to 65535) such as CHROUT (to print messages on the screen). With clever switching in and out of the ROM it is possible to locate parts of the program that do not require Kernal subroutines, or possible data for music, or even a bit-mapped screen there.

Finally, at a time when the prevention of software piracy is important, it is worth noting that programs located in hidden RAM cannot be examined by someone who does not have a disassembler that is written in machine code.



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Open Forum

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

Rotator

on Dragon

This program can demonstrate how a line, shape or picture can be rotated in a circle about a chosen centre.

The computer requires two parameters the number of lines to be drawn (from 1 to 300) and the chosen interval value.

After the input stage the hi-res screen is selected and the picture rotation drawn.

When the rotation has finished the process can be repeated by simply pressing the space bar.

You can print out the design if you have a suitable printer as a provision for hard copy is included in the program.

```
10 PCLEAR8.CLS
20 A$= ########################'
30 B$= ### PICTURE ROTATOR ###'
40 C$-'###   BY JOE LEE    ###'
50 D$-'###    1/12/1983    ###
60 E$-'######################
70 PRINT'    ',A$ PRINT'     ,B$
80 PRINT     ';C$.PRINT'     .D$
90 PRINT      ,E$.PRINT
100 PMODE4,5.PCLS0:COLOR1,0
110 PMODE4,1.PCLS0:COLOR1,0
120 '-----------------------
130 '----- introduction---------
140 '-----------------------
150 PRINT@192, INTRODUCTION REQUIRE(Y/N)
?'
160 A$-INKEY$.IF A$="Y' THEN 190
170 IF A$- N'THEN290
180 GOTO160
190 PRINT THIS PROGRAM IS DESIGNED TO
 ROTATE A PICTURE DRAWN IN      HI-RES
OLUTION GRAPHICS.
200 PRINT THE PICTURE CAN BE ROTATED
 AROUND A CENTRE AT ANY WHERE    WITHIN
 THE SCREEN.
210 PRINT'RESOLUTION OF THE SCREEN IS
 [240*191]"
220 PRINT'THE PICTURE CAN ALSO BE OUTPUT
 TO A TANDY CGP-115 COLOR GRAPHICPRINTE
R  ,
230 PRINT WHEN THE PICTURE STOP   ROTATI
NG YOU CAN PRESS[r] TO    REPEAT THE  PR
OCESS,PRESS(space-bar) TO DRAW AGA
240 PRINT     press any key to star'
250 IF INKEY$<>' THENCLS GOTO290ELSE250
260 '-----------------------
```

Baud Walk

Smokey bear

This week Baud Walk takes you on a transatlantic stroll around one of the largest — and most successful — databases in the States. Let's hope it's not long before these are more cheaply accessible in the UK.

Compuserve is aimed squarely at IBM PC owners, a menu driven Ascii system that's also able to respond to command words. I accessed Compuserve via trusty PSS — which incidentally accepts modems at a variety of speeds — and my time on-line was registering at around 15p a minute.

The database is divided into four main categories, home, business and financial services and personal computing. Dumb terminal emulation software is adequate for the task, although in the States tailored software is on offer to make Compuserve easier to use. The database scrolls the screen and you are able to attach your identity to different files and shuffle them around. It has a fairly simple on-line text processing function and a variety of programming languages.

If you want to know what hardware and other IT developments are about to land in the good old UK, Compuserve is the place to look. Like many networks, computer industry buffs are on Compunet and post up information almost daily about what's happened and what's going to happen. For instance, a fellow databaser tells me he knew the full spec of the Macintosh a good month ahead of information reaching the UK through the media.

On top of the PSS call, Compuserve bills you for computer access time which currently runs at around six dollars an hour off-peak.

Compuserve offers one other attractive service — a type of on-line CB, which allows you to have real time on-line conversations with other users. The screen displays the conversation to anyone who wishes to view (called a lurker) and a directory will display the number of people taking part and their CB handle.

On-line CB has some special-interest sections — for example, computing, cookery, medicine — all users can be anonymous hiding behind their handle on one of the 36 SIG channels.

Typing the command /Sta reveals the current status of the 36 channels. It read like this (3) 3# (14) 7 (33) 19. The channel number is in brackets and the number of users currently logged on next to it. The hash symbol tells you which channel you are currently monitoring. Once logged into a channel nothing more is required than to type in your sentence and press Cr.

Even on my call, which took me to Compuserve's mainframe in Ohio via PSS UK, and Telenet in the States, the response times were tolerable.

And despite all the high technology and vast databases on Compuserve I'm told that on-line CB is the service. Let's hope one of the UK networks switches on soon.

You can write to Compuserve for information — even if you actually don't want to join. The address is Compuserve, 5000 Arlington Centre Blvd, P O Box 20212, Columbus, Ohio 43220 USA.

Robin Wilkinson

Baud Walk is a new weekly column with news on networking, databases, reviews of modems and software and points of contact for information.

Any readers with experience of networking are asked to send their experiences or news of services to Robin Wilkinson, Baud Walk, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2H 3LD.

He can also be contacted on Prestel mailbox 019993727.

```
270 '---Inputing co-ordinates---
280 '------------------------
290 PRINT@192,: INPUT'HOW MANY LINES DO
YOU WANT TO   DRAW(1-300)',L
300 IF L>300 OR L<1 THEN 290
310 PRINT@256,, INPUT'ARE YOU SURE(Y/N)"
,K$
320 IF K$= N' THEN290
330 IF K$= Y" THEN CLS ELSE 310
340 DIM A(L),B(L),C(L),D(L),R1(L),R(L),O
1(L),O(L),P=1:F=4 71,F1=3.14,F2=6.28,F3=
1.57
350 FOR I=1 TO L
360 PRINT"LINE(";I, )"
370 INPUT"INPUT FIRST X CO-ORDINATE";A(I
)
380 IF A(I)>240 OR A(I)<0 TNEN 370
390 INPUT"INPUT FIRST Y CO-ORDINATE";B(I
)
400 IF B(I)>191 OR B(I)<0 THEN 390
410 INPUT"INPUT SECOND X CO-ORDINATE',C(
I)
420 IF C(I)>240 OR C(I)<0 THEN 410
430 INPUT'INPUT SECOND Y CO-ORDINATE',D(
I)
440 IF D(I)>191 OR D(I)<0 THEN 430
450 LINE(A(I),B(I))-(C(I),D(I)),PSET
460 NEXT I
470 INPUT'INPUT X CO-ORDINATE OF CENTRE'
,X
480 IF X>240 OR X<0 THEN 470
490 INPUT'INPUT Y CO-ORDINATE OF CENTRE"
,Y
500 IF Y>191 OR Y<0 THEN 490
510 '--------------------------
520 '----------printer----------
530 '--------------------------
540 CLS:PRINT:INPUT DO YOU WANT THE PICT
URE OUTPUT  TO THE PRINTER(Y/N) ,K$
550 IF K$='Y"THENPRINT'please ready the
printer":GOTO570
560 IF K$="N"THEN620 ELSE 540
570 CLS:PRINT"(1)-BLACK'
580 PRINT"(2)-BLUE'
590 PRINT"(3)-GREEN"
600 PRINT'(4)-RED"
610 INPUT'WHICH COLOUR WOULD YOU LIKE TO
 USE:-";J
620 CLS:INPUT'HOW MANY DEGREE AT A TIME
DO YOUWISH TO ROTATE THE PICTURE",G
630 IF G<1 OR G>359THEN620
640 IF K$="N' THEN720
650 FOR Q=1TO500:NEXTQ
660 PRINT#-2,CHR$(18)
670 PRINT#-2,'A'
680 FOR Q=1TO500:NEXTQ
690 PRINT#-2,CHR$(18)
700 PRINT#-2,"H"
710 PRINT#-2,'R0,-200'
```

Arcade Avenue

Tap dance

Yet another (mostly) Spectrum games week — which I assure you reflects the letters I receive and not my personal leanings. Where are all the Commodore owners? Can't you write?

Craig Waddell of Glenrothes sends out a cry for help to get past the third screen of the very picturesque *Jack and the Beanstalk* from Thor Can anyone help him? I was pleased to see some people sending in their lists of recommended games for the Spectrum. Dean Hartshorne of Wolverhampton likes *Ant Attack* from Quicksilva, *Deathchase* from Micromega. *Jetset Willy* and *Ostron* (which is a version of the arcade game *Joust*) from Softek (now renamed *Kwak Attack*, I think)

Gary Burrows of Liverpool suggests that Melbourne House's *Penetrator*, Softek's *Starblitz*, Psion's *Space Raiders*, Imagine's *Arcadia* and Megadodo's *Phoenix* are the best copies of *Scramble*, *Defender*, *Space Invaders*, *Galaxions* and *Phoenix* respectively Does anyone disagree?

Finally A Woods and P Page of Andover want to warn everyone away from Sinclair's *Games 1* "which comes complete with two UDG's". Considering its age, I'm surprised this tape is still available.

Kevin Allen of Weston-super-Mare says that to get infinite lives on *Android 2* "kill yourself four times, then find a spot where a monster goes over a mine If you time it right, you can be killed twice giving six lost lives You then have all the time you want." A tip all the way from Brussels by Said Le Page for Micromania's *Tutankamun*. "Merge the basic loader program and list it. Adding line 2. *Poke* 34953,57 *Poke* 34970,58 will let you start from tomb 1 to 9. Line 3 *Poke* 27279,x where x is 0–10 gives you infinite or 1–10 lives To finish type line 4. *Randomise* USR 27300 and *RUN*"

A letter from the mysterious 'Ensor', who has a high score of 48806 on *Ant Attack*, gives some useful tips. "You don't have to return to the front of the city to rescue the person, you can jump over the wall and they are safe Also, if you can get the person to stand on your head by running into a wall with them in front of you, then they will do a tap dance." Great fun! Please send a copy of your map when ready

Finally some more high scores. Robert Kidd of Ipswich sent in a list of impressive results: *3D Ant Attack* 44,285 *Pssst* 187,855 *Manic Miner* 31,709 on level 19 *Zzoom* 33,390 on level 6 *Jetpac* 56,800 on the fourth rocket

Chris Hughes of Sale in Cheshire has rescued all ten hostages in *Ant Attack* with a score of 46,210 Des Claypole of Peterborough has topped this with 46,537, and has also beaten Glenn Ackroyd of Bradford who scored 44,040 However, Glenn has reached some superb scores for *Bugaboo*, 31 seconds to escape in 12 moves, *Penetrator* 139,210 — there and back six times, and *International Soccer* for the Commodore with a record of 42 unbeaten matches on level 9 with 22 wins in a row and a best score of 6-0

Finally, Michael Lewis of Harold Hill is understandably full of praise for Sinclair's *Stop the Express* on which he has scored 2,920.

Tony Kendle

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments from playing tips on difficult games or programs you'd particularly like to praise (or blame!) then write to Tony Kendle Arcade Avenue *Popular Computing Weekly* 12-13 Little Newport Street, London WC2R 3LD

```
720 PRINT# 2,
730 PRINT# 2, ·STR$(J-1)
740 ' -           ------------
750 ' --store(angles&radius)
760 ' ----  ------------------
770 SCREEN1,1.FOR I-1 TO L
780 S-A(I).T=B(I).GOSUB820
790 R1(I)=R(I).O1(I)=O(I)
800 S=C(I) T=D(I) GOSUB820
810 NEXT I GOTO990
820 X1=ABS(X-S):Y1=ABS(Y-T)
830 R(I)=SQR(X1^2+Y1^2)
840 IF S>X THEN 870
850 IF S<X THEN 900
860 IF S=X THEN 930
870 IF T>Y THEN O(I)-ATN(Y1/X1):RETURN
880 IF T<Y THEN O(I)=F2-ATN(Y1/X1).RETUR
N
890 IF T=Y THEN O(I)=0.RETURN
900 IF T>Y THEN O(I)=F1-ATN(Y1/X1).RETUR
N
910 IF T<Y THEN O(I)=F1+ATN(Y1/X1).RETUR
N
920 IF T-Y THEN O(I)=F1.RETURN
930 IF T>Y THEN O(I)=F3.RETURN
940 IF T<Y THEN O(I)=F.RETURN
950 IF T=Y THEN R(I)=0:RETURN
960 '------ -----------------
970 ' - ---------rotate----------
980 '---- ---------------     -
990 FOR MM-1TO360STEPG
1000 IF P 5 THEN P-1 ELSE P 5
1010 PMODE4,P.PCLS FOR I 1 TO L
1020 IF R1(I)=0 THEN U-X:V=Y:GOTO1050
1030 U=X+R1(I)*COS(O1(I))
1040 V=Y+R1(I)*SIN(O1(I))
1050 IF R(I) 0 THEN U1=X:V1-Y.GOTO1080
1060 U1-X+R(I)*COS(O(I))
1070 V1-Y+R(I)*SIN(O(I))
1080 IF K$- Y  THENPRINT#-2, M +STR$(U*2
)+ , +STR$( 2*V)
1090 IF K$- Y THENPRINT#-2, D'+STR$(U1*2
)+ , +STR$( 2*V1)
1100 O1(I)-O1(I)+G*3 1416/180
1110 O(I) O(I)+G*3 1416/180
1120 IF U>239 THEN U 240
1130 IF U<1 THEN U 0
1140 IF V>190 THEN V-191
1150 IF V<1 THEN V=0
1160 IF U1>239 THEN U1=240
1170 IF U1<1 THEN U1=0
1180 IF V1>190 THEN V1=190
1190 IF V1<1 THEN V1=0
1200 LINE(U,V)-(U1,V1),PSET
1210 NEXT I
1220 SCREEN1 1:NEXT MM
1230 A$=INKEY$.IF A$-  THEN 10
1240 IF A$  R  THEN540
1250 GOTO1230
```

Rotator
by Joe Lee

Microradio

GW6JJN

Sky walk

The recent launch of the European Space Agencies Arianne 3 rocket highlights the big business of putting satellites into orbit. The advantage that the European system, Arianne has over the US Space Shuttle is that Arianne can take satellites higher and into therefore more precise orbits.

A geostationary orbit means that the rotation of the satellite in relation to the Earth is about the same so that the thing stays more or less where it was put, rather than going around the planet and only being available from a fixed place on Earth for a few minutes each orbit. This is vital for communications satellites, of course, particularly for satellite television. Aerials need only point in one direction and the transmitter is available 24 hours a day

The cost of taking the satellite up has to be compared to the cost of laying thousands of miles of fibre optic cables underground from the studio to each home as is cable television. The only advantage is that cables can be monitored so that subscribers to the cable network can be duly charged a fee. Access to a satellite, as long as you have the aerial and receiver, cannot be monitored so the revenue would have to come from advertising

Since a geostationary TV satellite that is high enough, and many are, can cover entire continents, they hold great incentives to television companies To many people, the prospect of satellite television is very desirable in Europe, for example, it may help to unify, language differences will be reduced and hundreds of channels could be available

Cable television, on the other hand, cannot hope to cover or reach such vast audiences, so will probably tend to stick to fairly specialised viewing such as local affairs, minority interests, sport, feature films, etc. Both systems in conjunction with each other could provide almost limitless choice in television viewing

This technology presents the broadcasting companies with a great dilemma At the moment the success of a station is tested by its ratings or number of viewers; that is, its ability to reach enough people to bring in sufficient advertising revenue.

The problem is whether to transmit by cable to a known number of paid-up viewers and be pretty sure of reaching them all, or to transmit to a hundred million potential viewers without any clear idea of how many might be actually watching I suppose it depends on what you are advertising I wonder which one Uncle Clive would choose to advertise on.

Ray Berry

This series of articles is designed for radio and microcomputer enthusiasts alike If you have any queries that you want answered hints and tips to share or topics that you would like to see covered write to Ray Berry, Microradio *Popular Computing Weekly* 12 13 Little Newport Street London WC2R 3LD

Tony Bridge's Adventure Corner



Summon help

As the purpose of arcade games is to test the reactions in a variety of ways, so the purpose of adventure games is to test the mind — although this can be achieved with varying degrees of style and cunning!

But the struggling adventurer eventually has to call it a day, and summon help. This is one of the functions of this column, a function that becomes increasingly difficult to perform as more and more gamers discover the delights and frustrations of adventures.

The International Adventure Club has recently been formed by Simon Clarke to come to the rescue of all those trapped in a goblin's dungeon — and harrassed columnists! For a small yearly membership fee, an excellent Helpline service will be available to you. Simon used to run an Adventure Help column, so should know what he's talking about — and, of course, as the membership grows, so the pool of adventure experience gets larger and larger, which benefits all members in the end. Not only this, but software is obtainable at special discount prices. The IAC has just gone onto the Prestel Mailbox, which means that, as long as you can plug into it, help is just a phone call away! The Club Newsletter will be on the network, and subscriptions can be renewed, as well as orders placed. "Several hundred members" are already using the system. If you're interested, write to International Adventure Club, 10 Ennis Close, Harpenden, Herts AL5 1SS.

Someone else who is just a phone-call away is In-Home Computing, a company that has been set up by a couple of keen adventures, John Miles and Ken Matthews, to give help to baffled adventurers everywhere. Both are interested in computing, electronics, science fiction and strategy wargames, and, upon being made redundant from their jobs, decided to pour everything they had into creating a business based upon what they held most dear — computer adventures. This business will consist of a shop and an Adventureline, which will be a 24 hour Ansaphone that adventurers, customers or not, can use.

"Although we have solved quite a few adventures ourselves, there are still a few gaps, and we hope to have adventurers send us their solutions, maps, etc., for evaluation so that the best of these can be reproduced professionally for sale, with royalties payable to the author. We will also accept software for assessment with a view to publication on our own label. Finally, we would like to point out that, as a specialist dealer, we will be making our shop, particularly the basement dungeon, a pleasant and exciting place to visit," says Ken.

The shop is not quite ready, but in the meantime, Ken is happy to help — just call him on 01-646 4441 (not a 24hr service yet!), or write to him (including a sae) at: Flat 1, 29 Upper Green East, Mitcham, Surrey.

On to the Help for this week, and the first enquiry about an adventure that I mentioned a few weeks ago, and liked very much for its packaging as much as the adventure itself:

"I we playing Nosferatu (Spectrum 48K), *and I can't get past the bus — could you help me get on, and also find that parachute you were talking about?"* (Owen Jones, Dagenham)

Can anyone help with the bus? As for the parachute, Owen, that is on the plane at the start of the adventure. I'm afraid that you will have to make the exact number of moves in order to get out of the plane before it crashes — admire the scenery for *one* move and you're done for! For instance, don't bother with stumbling around in the bar, it's a red herring, I'm sure. But you *must examine* the sleeping passenger and get what you find *on* him. The parachute is in the locker at the rear of the plane, and you will get the combination to the lock by applying a bit of though to a numerical clue that you have been given before. And, when you have landed, don't forget to *drop* the parachute, as the wind is blowing strongly.

Vaughan Price has managed to solve several adventures, and offers his help to others in distress. *"The adventures I have completed are as follows: "Ten of the eleven* Mysterious Adventures *by Digital Fantasia* [actually, there are now 13, so check with Vaughan] — Adventureland, Pirate, Voodoo Castle, Secret Mission *and* The Count *by Scott Adams* — Old Father Time *by Bug Byte and* The Incredible Hulk, *the first* Questprobe *by Scott Adams.* "If you have a problem with one of these adventures, write to Vaughan at: 30 Llantwit Road, Neath, West Glamorgan, South Wales SA11 3LB.

Vaughan gives me, as a starter, a clue for those who might be having trouble with *The Hulk*. If you are experiencing difficulty staying as *The Hulk* (look at the list of words at the end of the Corner), then 9, 17. Many people have asked how to get out of the chair at the very start — 20,5 *and* 22,6. Others are having trouble actually scoring any points — what you need to do in this case, is 16,8,24,10,4,21,2 15.

If you have completed, or are in the middle of *The Hulk*, write and let me know your thoughts on it — as the first Scott Adams adventure for a long while, it has been eagerly awaited, but several of your letters have said it is disappointing. To be fair, *these* were balanced by just as many saying how much they enjoyed it.

In the Corner of Vol 3 No. 26, Debbie Dore was having trouble with getting through the crack, and Michael Letterty of Fife charged in to the rescue: *"To enter the crack you must 20,25,11, but to 20,25,11, you must first perform some magic on the statue. Details on how to do this can be found 3,25,19. To get the second treasure, you must 26,7,25,14"* [You'll find a way to do this if you remember your natural history]. Michael finishes by saying, *"I agree with Debbie's ratings for* Voodoo *and* Pirate *and I would like to add my vote on* Secret Mission — *9/10. This adventure is the most challenging of the first four which are at present available for the BBC Micro.*

1 Red; 2 Type; 3 Beyond; 4 Area, 5 Mad, 6 Tab, 7 Away; 8 Game; 9 Remember 10 Fuzzy 11 Bay 12 Some 13 Herring 14 Snakes, 15 Score 16 Pass, 17 Nightmare, 18 Deep 19 Fireplace; 20 Get 21 Then, 22 Bite, 23 Scare, 24 In, 25 The

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further write to Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

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Oric questions

Philip Rumsey of Erskine writes

Q Please can you tell me the answers to the following quesitons: 1. Can you buy any other language (apart from Forth) for the Oric-1 computer? 2. Can you tell me a suitable modem to buy for my computer? 3 How do you get the ~ character on the Oric?

A 1 Not that I am aware of. 2. In order to use a modem on the Oric you will need an RS232 interface. The only one I know of is produced by MCP (of 12 High Street, Clydach, Swansea AS8 51F), which costs nearly £40 This would then enable you to connect a modem to your machine MCP themselves recommend the TELEMOD 2 modem, but a variety of others can be used. 3. This character is called a 'tildi'. As the Oric uses the ASCII character set, and the tildi is not part of this set the only way you can use this character would be by creating a user-defined graphic.

Hardware extension

Bryan Lewis of London writes

Q I have a 48K Spectrum with microdrives and interface 1 attached. I would like to build a piece of hardware on to my computer so that when I push one key, the computer will automatically load or save a program onto cassette or cartridge. Please could you advise me on how I would go about making one, or if there is any such item on the market.

A The hardware extension you mention is not one I have heard of as being available.

Examples of this sort of project are usually found in publications like *Sinclair Projects* and *Micro Electronics*. The *Sinclair Spectrum Hardware manual*, published by Melbourne House, will be invaluable to you if you do carry on with this, as will a copy of *Spectrum Service Manual*. The latter publication is obtainable from PV Tubes, of 104 Abbey Street, Accrington, Lancs Although it costs £20, I think that you will find it extremely useful, and it could well stop you from making any really damaging (and expensive) mistakes

Coloured graphics

Jeremy Rompold of Swansea writes

Q Please could you tell me how to get multi-coloured graphic characters on the BBC micro?

A In MODE 7 it is possible to print graphic characters with different background and foreground colours, simply by using the control codes Eg, *PRINT CHR$(145); CHR$ (157), CHR$(148); "graphics"* would have the effect of printing the graphics character(s) in blue on a red background.

If you with to print characters with each pixel in a different colour, then you will need to use machine code You can either write to the screen directly, or via OSWORD calls; eg, assuming that we are in MODE 1

Each byte in screen memory corresponds to 4 pixels (2 bits per pixel) Each pixel can be one of four colours, and these combinations are identified by the binary values 00, 01, 10 and 11

Therefore, if you wanted the first pixel in the row to be in colour 3, the second to be in colour 1, the third in colour 0 and the fourth in colour 2, then the bit pattern you would need to place in screen memory is 11 01 00 10, or E6(hexadecimal) Exactly the same principle works in the 16 colour modes

Genie books

Richard Goldring of Ilfracombe, Devon writes

Q I own a colour Genie computer, which I have been programming in Basic for some time. Now I feel I would like to learn machine code in order to speed up my programs. Could you supply me with titles of any books on the subject?

A There are a number of books on Z80 machine code programming One of the best, because it is the most comprehensive, is *Z80 Assembly Language Programming* by L Leventhal. This book is rather expensive (£16) and so I suggest you ask your local public library to obtain it for you to have a look at before you buy it. (That applies to any book I recommend)

Unfortunately, I have not come across any books which specifically cover machine code for the Genie However, a source of information for you on that and other topics (adventure writing) is National Colour Genie Users Group, 64 Silver Arcade, Leicester.

Intense lines

D C Mellalieu of Southport Merseyside writes

Q I have a Series 3 Spectrum, which I use with a 12" Sony black and white television. Regrettably, there is a great deal of interference on the screen which takes the form of many lines of varying intensity Nothing I do seems to rectify this problem. Can you help?

A Sinclair machines and Sony televisions seem to have something against each other I have received a number of letters from readers suffering this and similar problems The TV picture on all models of the Spectrum can be adjusted internally (models 1 and 2 differ from model 3 in the way the adjustment is made)

My advice to you, and anyone else suffering this type of problem, is to either take the Spectrum back to the shop where you bought it (if your guarantee has not expired) and explain that it produces a distorted TV picture They should then replace it for you If you can't do that, then you should get your Spectrum adjusted.

Prone to noise

Andrew Halstead of Halifax writes.

Q I have a Commodore 64 and am considering buying a modem. What is the difference between an acoustic modem and a direct coupled modem?

Also, is it true that the acoustic type can pick up noise from the room and cause errors in the program? Which type do you recommend as being able to receive as well as transmit data?

A An acoustic modem passes information from one computer to another through the equivalent of a telephone handset. They require the use of a regular telephone handset (ie, a connected telephone) They do suffer from the serious flaw you mention in that they are prone to pick up noise from the room they are in.

The direct coupled (or hardwired) modem is plugged straight in to the telephone network via a British Telecom jack socket. These modems do not suffer from the room noise problem as they do not depend on the use of microphones to pick up and transmit signals Both types of modem are capable of sending and receiving data. However, I would go for the hardwired variety

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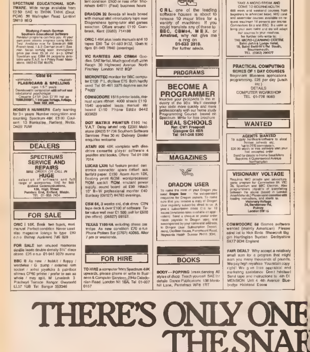
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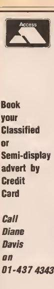
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48K SPECTRUM lots of S/W and mags still under guarantee board Tel 203 — 0848 anytime

48K SPECTURM, 7 Months old, software inc Hobbit stonkers football manager chess plus many more and £20 worth of mags and two programme books worth £10 sell the set for £130

FOR SALE 48K Spectrum with Kempston joystick and interface over £150 of original software including Hobbit Mugsy and code name mat £160 swap CBM64 and C2N ring Nigel on (71) 72380

Wanted

SWAP SPECTRUM software Scuba Dive Deathchase Chuckie Egg Android One Android Two Ad Astra Pssst Arcade or others all originals for Currah Speech Unit and demo cassette Tel 01-701 4380

SPECTRUM GAMES for swap H U R G (sell £10) Lazer Snaker Jet Set Willy Code Name Mat Caesar The Cat, Fighter Pilot Wrdz And The Bees, Zzoom Ground Attack Tel (0272) 595599

SPECTRUM SOFTWARE sale or swap including Valhalla, Cruising Android and several more Write in first instance with list to Tim Hortopp 53 Walsham Place Hamworthy Poole Dorset SAE appreciated

HEY HACKERS! Want a computer penpal? Name age sex andrea computer and penpal wanted + ten shillings for swap to Seaward 42 Elm Ave Deans Livingstone W Lothian EH54 8ET

SWAP KONG. Jetman, Horrace and Spiders, Invincible Island Super Spy Grand Prix Driver Pharos Tomb Inca Treasure, Handicap Golf Worth over £50 For Currah Uspeech Tel 0254 858245

WANTED Programmable joystick and interface for Spectrum. Must be in ex condition Prefer m/drive compatible No silly prices. Please write to: Jim Wood 28 Hough Road Kings Heath, Birmingham B14 6HV

WANTED ZX80 Any memory size Will pay up to £7 Write to John Skillet Gilbert Murray Hall, Manor Road, Leicester LE2 2LH

WANTED One roll of Sinclair ZX Spectrum printer paper Good price paid or swapped for Spectrum computer game(s) Needed urgently! Tel Motherwell 64320

WOULD ANYONE be interested in WWII Spectrum-aided wargaming or role playing Please contact Norman Parker 4 Hermes Villas Bran End Stebbing Essex Tel Stebbing (0371[illegible]) 48K after 5pm

WANTED Currah speech to swap for an interface two with Kempston joystick and space raiders cartridge Write to Richard Averil 3 Sunridge Downend, Bristol BS16 2RT

WANTED Help! We are a budding software company looking for advice on marketing program please help Write to Jeremy Ford 14 Kendal Avenue Rednal Birmingham B45 9OA with details

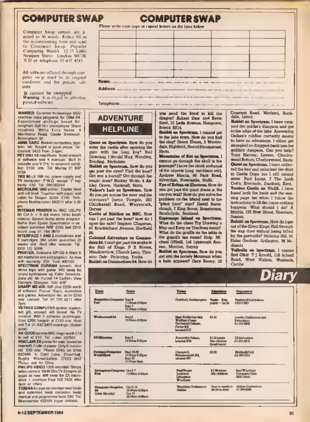
WANTED MPF 11 software information etc including assembler programme, basic renumber screen editor chess Tel 0232 672477

WANTED Spectrum originals cheapest price asked secures sale of Android Mugsy Sabre Wulf and/or Moon Alert (will swap) Tel Steve (0703) 767560 after 4pm during weekdays

SWAP Dragon 32 100's of software, joystick, books cassette recorder for Commodore 64 and Commodore recorder Must collect. Tel Robin Thetford 3654 or Church on the Way Church Road Thetford

WANTED 48K Spectrum + tape recorder for less than £100 Tel Martin 061-445 8630 after 5pm

WANTED Microdrive + Interface 1 Also leads for Epsom printer for Spectrum 48K computer Tel 01-845 2036



COMPUTER SWAP

Computer Swap entries are limited to 30 words. Either fill in the accompanying form and send to Computer Swap *Popular Computing Weekly* 12-13 Little Newport Street London WC2R 3LD or telephone 01-437 4343

All software offered through computer swap must be in original condition and for private sale only

It cannot be swapped

Warning It is illegal to advertise pirated software

COMPUTER SWAP

Please write your copy in capital letters on the lines below

Name ....

Address ....

....

Telephone..............................

WANTED Co-writer fn develope 6502 machine code programs for CBM 64 Experienced proferge based Birmingham Suit 18+ unemployed Share royalties Write Tony Noble 9 Menthorne Road, Castle Bromwich Birmingham 38

JUNK YARD Broken computers, joysticks etc Bought at good prices Tel Coshull 3453 from 3-5pm.

PET 2001 8K new Roms Small amount of software and 4 manuals Built in cassette and V D U In excellent condition £100 ono Tel Murray 01 647 0754

TRS 80 L II 16K inc. power supply and TV modulator P W O except 'Y' key faulty £40 Tel 096362544

MICROLINE U80 printer Tractor feed and roll feed Together with paper and cable for Dragon 32/64 £140 Telephone Northampton 582211 after 5.30 pm

RITEMAN PRINTER for BBC 120LPS 80 Col 9 × 9 dot matrix Hires beside ribbons Screen dump demo program Better than Epson Specification in excellent condition RRP £285 Sell £210 brand new 01 784 0979

INTERFACE 1 AND 2 microdrives and 6 cartridges Still under guarantee (6 weeks old) Best offer secures Tel (029 12) 5058.

PRINTER. Seikosha GP100 A Mark II dot matrix for text and graphics As new with warranty £95 York 490109

SPECTRUM CURRAH speech And demo tape with game Will swap for sound synthesiser eg Fuller Timedata Zonx etc Mr Purcell 14 Cathkin View Carmyle Glasgow G32 8AF

SHARP MZ-80K 48K plus £200 worth of software Pascal Basic, assembler and games. Adventure etc as for £250 one London Tel 01 722 6611 after 7pm

VETREX COMPUTER system duplicated gift, unused still boxed No TV needed With 5 software cartridges Cost £200 bargain at £120 ono Must sell Tel 01-642 8475 evenings. (Sutton area)

AS GOOD as new BBC mags worth £18 to sell at £10 Tel Luton 502001

SINCLAIR ZX printer for sale boxed as new with 7 rolls of paper Only 8 months old £30 ono Phone Chris on 0788 832488 4, Coral Lane, Ensenhall Rugby Warwickshire CV23 0HZ Please ask for Chris.

PHILIPS VIDEO 1500 recorder Sanyo video camera B&W 22in TV 20 tapes all basic as new Will swap for ZX microdrive + interface Paul 722 7426 after 6pm or offers.

TI99/4A for sale as new tape load basic and extended basic cassettes basic manual and programme book £80 Tel Morecambe 423105 buyer collects.

ADVENTURE HELPLINE

Quest on Spectrum. How do you enter the castle after opening the gate with the long key? Neil Downing, 1 Herald Way, Woodley, Reading Berkshire.

Hobbit on Spectrum. How do you get past the eyes? Find the boat? Get into a barrel? Get through the magic door? Nickey Write, 4 Ashley Grove, Hucknall, Notts.

Velnor's Lair on Spectrum. How do you get across the river and the crevasse? Justin Temple, 381 Chickerell Road, Weymouth, Dorset

Castle of Riddles on BBC. How can I get past the bear? how do I open the safe? Stephen Chapman, 85 Brackleharst Avenue, Sheffield 28.

Colossal Adventure on Commodore 64. I can't get past the snake to the Hall of Kings. P R Morris, Meadowview, Church Lane, Thorston Dale Pickering, Yorks.

Hobbit on Commodore 64. How do you send the bird to kill the dragon? Robert Daw and Kevin Scott, 31 Leda Avenue, Hengrove, Bristol BS14.

Hobbit on Spectrum. I cannot get to the lake town. How do you find the ring? Simon Illman, 2 Westerdale, Highfield, Hemel Hempstead, Herts.

Mountains of Ket on Spectrum. I cannot go through the skull in the passage? I have the cloak and most of the objects (ring necklace etc). Andrew Morris, 86 Park Road, Silverdale, Newcastle, Staffs.

Eye of Zoltan on Electron. How do you get past the giant doors in the canyon wall? How do you solve the problem on the island next to the "plant here" sign? David Barraclough, 7 King Street, Stonehouse, Strathclyde, Scotland.

Espionage Island on Spectrum. What do the clues Try Drawing a Map and Keep on Trucking mean? What do the graffiti on the table in the guard's tee mean? Help Michael O'Neill, 164 Lynmouth Avenue, Morden, Surrey

Hobbit on Spectrum. How do you get into the Lonely Mountain when a hole appears? Gary Boony, 23 Crescent Road, Marland, Rochdale, Lancs.

Hobbit on Spectrum. I have escaped the goblin's dungeon and get to the edge of the lake Answering Gollum's riddles correctly seems to have no advantage. I either get strangled or dragged back into the goblin's dungeon. Can you help? Tony Harvey, Lynton, Chorleywood Bottom, Chorleywood, Herts.

Quest on Spectrum. I have collected the key and unlocked the door to Castle Oops but I still cannot enter Paul Lucas, 7 The Lock Cott's, Riverside, Dartford, Kent.

Voodoo Castle on Vic20. I have found both the book and the missing page but when I follow the instructions to lift the curse nothing happens What should I do? A Morris, 176 New Street, Horsham, Sussex.

Hobbit on Spectrum. How do I get out of the Elven Kings Hall through the trap door without being killed by the portcullis? Nicholas Hill, 85 Hales Gardens Erdington, W Midlands.

Valhalla on Spectrum. I cannot find Ofnir T J Arnold, 118 School Road, West Walton, Wisbech, Cambs

Diary

Event	Dates	Venue	Admission	Organisers
Hampshire Computer Fair	Sept 6 11.00am-8.00pm Sept 7 10.00am-5.00pm	Guildhall, Southampton	Trade free public — £5.00	[illegible]
Walthamstow 84	Sept 8 10.00am-5.00pm	Main Exhibition Hall, Waltham Forest Technical College, Forest Rd London E17	£1.00	London Exhibitions and Promotions 01-[illegible]
ZX Microfair	Sept 8 10.00am-6.00pm	Alexandra Palace, London N22	£1.00 adults 50p children (in advance)	ZX Microfairs 01-801 [illegible]
Personal Computer World Show	Sept 15-16 10.00am-7.00pm Sept 20 10.00am-5pm	Olympia 2, Hammersmith Rd, London W14	£3.00	Montbuild Ltd 01-[illegible]
Livingston Computer Fair	Oct 6-7 10.00am-6.00pm	Forum House Ladywell Livingston W Lothian	£1.00 adults 50p children	East/W Lothian Computer Club [illegible]
Computer Graphics 84 (trade only)	Oct 9-10 10.00am-6.00pm Oct 11 10.00am-4.00pm	Wembley Conference Centre	Free in advance £5.00 on door	Online Conferences 01-[illegible]

New Releases

STORMY

More games from Atlantis who bare joined Mastertronic in the giddy world of £1.99 games and whose games, so far, have proved excellent value for money

Master Mariner is a trading game in which you play the owner of a ship who trades in various goods, trying to buy and sell and make a profit.

Aside from the sheer mechanics of the market place which will affect how much, if any, profit you make, factors like storms, finance companies and getting caught for dealing in arms, will also affect you.

I've seen more complex simulations, but it's still good fun to play with intermittent animated sequences to liven it up. At £1.99 it's got to be a winner, hasn't it, John?

Program	*Master Mariner*
Price	*£1.99*
Micro	*Spectrum*
Supplier	*Atlantis* *19 Prebend Street* *London N1 8PF*

WONKY ECG

Software that manages to educate at a sophisticated level, ie, not five and six year olds, is a rare and splendid thing. So, even though it is hardly likely to be of use to the average software punter, Medidata is to be congratulated for its *Diseases of the Heart* program.

This is a serious package indeed, dealing as it does with the Endocardium, Valves, Myocardium, Pericardium and all the diseases they may have. The computer is used to display dubious pulses, wonky ECG's and even a variety of heart sounds all of which are guaranteed to give you a pain in the chest and make you decide to take it easy for a bit.

The program is very intelligently designed and adopts a kind of mini teletext design to present the information — for example, having the first part of the text on cardiac arrest you might be told to go to 103 for more information.

The system works well and does seem to be a good way of presenting a database of information, there is even a microdrive option. The program is also one of those classic examples of being in Basic not mattering. Certainly of interest to Spectrum owning Doctors, O and A level Biology students, and hypochondriacs everywhere.

Program	*Diseases of the Heart*
Price	*£6.95*
Micro	*Spectrum*
Supplier	*Medidata* *PO Box 25* *London* *NW9 8BW*

FILL ROUTINE

Artist is a computer-aided design program for the BBC B. It isn't the first of its type and certainly won't be the last, but it's neatly designed and inexpensive

Aside from the basic drawing and filling routines — complete with four sizes of cursor — there are menu options for the simple creation of Circles, Elipses and Triangles, Fill routines, Background colour change, reference grid, etc. In short, more or less everything you could want including a save to disc if you have it.

There is a menu, which is continuously displayed to remind you of what key does what and does away with the need for any separate manual.

Program	*Artist*
Price	*£8.95*
Micro	*BBC*
Supplier	*MRM* *17 Cross Coates Road* *Grimsby* *South Humberside*

Pick of the week

STATE OF THE CASE

Sherlock Holmes, possibly the longest delayed program ever, has now been released. Quite obviously the milling hoards of Hobbit fans will have been waiting with bated breath and must have been on the point of lung collapse

The problem for some of those people though, is, that Sherlock is very likely not to be what they expected at all. Judge it too quickly and disappointment may set in.

The biggest shock with Sherlock is that it has very few graphics indeed and the few it has are not very impressive, *Knight's Quest* quality at best. The best policy is to regard the graphics as a mere extra bonus and regard Sherlock instead as possibly the most sophisticated text adventure home micro yet seen.

The plot, obviously, involves Sherlock Holmes, Watson, several dastardly murders and much traveling by hansom cab. The English analysis system is almost exactly the same as used on *The Hobbit*, although the vocabulary is larger (800 words understood and 53 different actions possible) including adverbs like fairly, furiously, steadily and madly — although where you might use this last one I can't guess

Apart from the occasional graphics which take up about a third of the screen, the display is in two sections; the top two thirds for the vast amount of text displayed and the bottom third for your commands. From the moment you make your first keypress when the game is loaded a clock starts and you are in 'real time'

The concept of real time is not new to adventures but I've never seen it used in quite the same way as it is in Sherlock. For example, suppose you get a cab to a station the journey might take ten minutes or more and in the game it would literally take ten minutes before you arrived. During this time you might want to converse with Watson about the state of the case or, thankfully, you can artificially speed up the clock by typing *Wait Until* and following it with what ever time you expect the journey to be over

Like *Hobbit*, there are a number of separate characters who lead an independent life and to whom you can speak. You can 'Say to Watson "Read the Daily Chronicle"' and the like, but there is also a significant additional element to conversation. At various points you will have to talk to and argue with a variety of suspects, using the phrase 'tell me about' as in. 'Say to Major Foulkes tell me about the pistol' which will elicit a mixed bag of information about himself, other characters (perhaps), alibies and so on. He might also be lying, of course.

Sherlock Holmes the adventure is about as devious as Sherlock Holmes the master sleuth. After several hours I still hadn't even found the right train for Leatherhead and the program told me to give up. I think it's probably too early to commit oneself yet to Sherlock — it's going to need a lot of time, but my hopes are high.

Program	*Sherlock Holmes*
Price	*£14.95*
Micro	*Sinclair*
Supplier	*Melbourne House* *39 Milton Trading Estate* *Abingdon* *Oxon OX14 4TD*

UP-TEMPO

The Spectrum is not short of music programs, Surprising really when you consider how hopeless the sound is, and they all do pretty much the same things *Spectune* is no exception but it's better than most. It's successful because it concerns itself with teaching matters.

It has the usual options to choose Key signature, tempo, beats per bar, etc, and you can compose using the cursors and screen. The program will ask you questions, play tunes and generally let you play about with your masterpieces

Program *Specture*
Price *£5.95*
Micro *Spectrum*
Supplier *XORSoft, Unit 7, Newington St, Hawthorne Ave, Hull HU3 5ND*

FLOATING DEBRIS

Strange Loop is the title of yet another release from Virgin — part of a small number of titles intended for the autumn/winter season. But *Strange Loop* is quite different from the usual standard of Virgin games (almost without exception between bad to run of the mill) *Strange Loop* is unique, graphically impressive, vast, and devious; in short, brill.

In the game you guide a vaguely *Jetpac*-like spaceman through a vast mechanical factory patrolled by robots and full of various bits of floating debris — indirectly harmful since as they bash into you, they gradually puncture your space suit and your life supporting oxygen escapes

Your task is to find your way to the factory control room which lies somewhere within a matrix of 256 rooms, many of them exceedingly dangerous. The screen displays a large view of the room you are in, with control panels at the bottom of the screen and a smaller map display showing you what lies in the adjacent rooms

Blasting, as such, is a relatively unimportant aspect of play In fact, this is an arcade adventure to which you really do have to use adventure thinking to stumble your way from death dealing room to death dealing room. There is a jet-cycle that is useful for some parts of the maze (but can you figure out how to get it?) Not only all this, but it's cheap too

Program *Strange Loop*
Price *£5.95*
Micro *Spectrum*
Supplier *Virgin Games, 2/4 Vernon Yard, Portobello Road, London W11 2DX*

GLOOM

Zorakk the Conqueror is a graphic adventure in the strategy mould rather than the animated figures of *Valhalla*, etc. The main graphic is a map that tells you where you are and what can be found in the immediate vicinity.

Your quest is to obtain the three parts to the crown of Ultimate Darkness (not to be confused with the three parts of the crown of pretty severe gloom), each of the parts being located in different areas — Lannia, Duram and Zarthyala.

To complete the quest will involve bargaining in the Bazaar for warriors and food, doing battle and exploring tombs and ruins. You move on the screen from square to square with a text area telling you what's going on. Graphics are large and colourful and strategy buffs should find nothing to complain about.

Program *Zorakk the Conqueror*
Price *£7.95*
Micro *BBC B the Conqueror*
Supplier *Icon, 58 High Street, Gosforth, Tyne & Wear, NE3 4AA*



LIGHTNESS

Forest at World's End is one of the best graphic adventures of the old school, ie an adventure with some graphic illustrations, I've seen in quite a while Plot wise well, it concerns the continuous battle between the forces of light and darkness in which princess Mara has been captured by the evil wizard Zarn, etc, etc.

The graphics, though, are really quite impressive, apparently drawn by somebody who actually knows how to draw Basically, it only understands the usual syntax of verb noun, but there are enough evocative touches in the place descriptions for that not to notice too much.

If the plot doesn't bother you in its lack of originality and you simply want a good graphic adventure to add to the collection, this one looks well worth having

Program *Forest at World's End*
Price *£5.50*
Micro *Spectrum*
Supplier *Interceptor Micros, Lindon House, The Green, Tadley, Hampshire*

OLD HANDS

ZX81 owners, and I believe there are still one or two left, might like to know of *Spectrumiser* by James Paton. This is a machine code utility program that lets you use hi-res on your games; a similar technique to that used by Software Farm on its well-received games.

It couldn't in all honesty be said to be an easy program to use — you will certainly need to be familiar with much of Basic to get the most from it — but then probably most ZX81 owners are old hands at the programming game anyway

Program *Spectrumiser*
Price *£5.50*
Micro *ZX81*
Supplier *James Paton, 2 The Avenue, Fallings Park, Wolverhampton*

DECISIONS

Puffin is soon to release two more packages in its combined software/book packages — *The Forest of Doom* and *Citadel of Chaos*. Both are for the Commodore 64 although a Spectrum version of the former is expected.

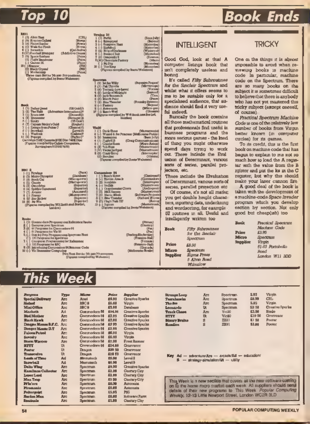
The games are firmly based on the Fighting Fantasy books and thus as a computer game they are somewhat different from the norm.

For those not familiar with the books, they are unlike conventional narrative tales and instead consist of a large number of numbered paragraphs — which form the fragments of several complete stories with similar themes In some you are triumphant, in others you fail miserably What decides this are the decisions you take, and the throw of dice which will give you amounts for stamina and bravery.

Although it sounds cumbersome, it works well, although it's easy to cheat — but obviously it's ideally suited to a computer The *Forest of Doom* has everything the book has with the addition of sound graphics, automatic dice throwing instantaneous display of character sheet, text sheet, notebook and so on.

If you like the books you'll certainly like the program. If you're used to more conventional adventures, it's uncertain whether you'll find this to your taste.

Program *The Forest of Doom*
Price *£5.50*
Micro *Commodore 64*
Supplier *Penguin Books, Bath Road, Harmondsworth, Middlesex, UB7 0DA*



Top 10

ZX81
1 (3) Alien Rain (CRL)
2 (4) Krypton Collected (Rowan)
3 (4) Planet Raider (Rowan)
4 (5) Walk the Plank (Rowan)
5 ( ) Scramble (Quicksilva)
6 (1?) Football Manager (Addictive Games)
7 (9) Space Raiders (Psion)
(9) Flight Simulation (Psion)
(-) Games 1K (Psion)
10 ( ) Hopper (PSS)
(9) Black Crystal (PSS)
( ) Mothership (Psion)
Three right Bar for 7th and 8th positions.
(Figures compiled by Boots/Websters)

Dragon 32
1 (1) Pettigrew's Diary (Shards) [illegible] (Bean Jolly)
2 (-) Ensnared (Beyond)
3 (-) Dungeon Rats (Microdeal)
4 (-) Eightball (Microdeal)
5 (4) Ring of Darkness (Wintersoft)
6 (-) Buzzard Bait (Microdeal)
7 (6) Donnerly [illegible] (Rowan)
8 (10) Chocolate Factory (Mirasto)
( ) Big Dig (Microdeal)
10 (-) The King (Microdeal)
(Figures compiled by Boots/Websters)

Spectrum
1 (3) Jet Set Willy (Software Projects)
2 (1) Full Throttle (Micromega)
3 (4) Tornado Low Level (Vortex)
4 (2) Lords of Midnight (Beyond)
5 (5) Jack the Nipper [illegible] (Thor)
6 (6) Match Point (Psion)
7 (8) Blue Thunder (Foundry Systems)
8 (-) Psytraxx [illegible] (Beyond)
9 (-) Automania (Mikro-gen)
10 (-) Sabre Wulf (Ultimate)
(Figures compiled by W H Smith and Son Ltd, London)

Book
1 (1) Dallas Quest (US Gold)◊
2 (2) The Hulk (Adventure International)†
3 (1) Bruce Lee (Datasoft)◊
4 (3) Encounter (Novagen)◊
5 ( ) Sinky (US Gold)
6 (7) Captain Sticky's Gold (English)
7 (-) Escape from Pulsar 7 (Channel 8)
8 ( ) Snowball (Level 9)
9 ( ) Warlock (Calisto)†
10 (4) Popeye (Parker)*
Cartridge †16K Cassette ◊32K Disc *48K Disc
(Figures compiled by Calisto Computers, Birmingham 021 632 6458)

Vic 20
1 ( ) Dark Stars (Mastertronic)
2 (-) Wizard & the Princess (Melbourne House)
3 (3) Bassamo [illegible] (Bean Jolly)
4 (1) Flight 015 (Craig Communications)
5 ( ) Chariot Race (Micro Antics)
6 (5) Sub Hunt (Mastertronic)
7 (10) Vegas Jackpot (Mastertronic)
8 (9) Crazy Kong (Interceptor)
(3) Boomer [illegible] (Visions)
(Figures compiled by Boots/Websters)

BBC B
1 (1) Fireflags [illegible] (Psion)
2 (2) Micro Olympics (Database)
3 (8) Rock Car [illegible] (Micropower)
4 (3) Ghouls (Micropower)
5 (3) Overdrive (Superior)
6 (4) Spitfire Command (Superior)
7 (7) Aviator (Acornsoft)
8 ( ) Frenzy (Micropower)
9 (10) Star Striker (Superior)
10 (6) Mr Wiz (Superior)
(Figures compiled by WH Smith and Son Ltd, London)

Commodore 64
1 ( ) Beach Head (Centresoft)
2 (-) Hover Attack (Commodore)
3 (3) Scramble (Interceptor)
4 (-) Ski Bob [illegible] (Mastertronic)
5 ( ) Grandmaster Chess (Audiogenic)
6 (3) BMX Racers (Mastertronic)
7 (4) Manic Miner (Software Projects)
8 ( ) Blue Thunder (Richard Wilcox)
9 (7) Flight Path 737 (Anirog)
10 (-) Squirm (Mastertronic)
(Figures compiled by Boots/Websters)

Books
1 (1) Commodore Programmers Reference Books (Pitman)
2 ( ) Discover your Spectrum (Century)
3 (8) 60 Programs for Commodore 64 (Pan)
4 ( ) 60 Programs for Vic 20 (Pan)
5 ( ) Step by Step Programming Spectrum Plus (Dorling Kindersley)
( ) 100 Programs for Spectrum (Prentice-Hall)
7 ( ) Computer Programming for Reference (Fontana)
( ) 100 Programs for BBC (Prentice-Hall)
9 (8) Introducing Commodore 64 Machine Code (Granada)
10 (-) Vic Innovative Computing (Melbourne Books)
Two from [illegible] for 5th and 7th positions.
(Figures compiled by Websters)

Book Ends

INTELLIGENT

Good God, look at this! A computer listings book that isn't completely useless and boring.

It's called *Fifty Subroutines for the Sinclair Spectrum* and whilst what it offers seems to me to be suitable only for a specialised audience, that audience should find it very useful indeed.

Basically the book contains all those mathematical routines that professionals find useful in business programs and the more serious games - the kind of thing you might otherwise spend days trying to work out. These include the Evaluation of Determinant, various sorts of series, parallel projection, etc.

These include the Elvaluation of Determinant, various sorts of series, parallel projection etc

Of course, it's not all maths; you get double height characters, inputting data, underlining and wordsorting, for example - 57 routines in all. Useful and intelligently written too

Book	*Fifty Subroutines for the Sinclair Spectrum*
Price	*£8.95*
Micro	*Spectrum*
Supplier	*Sigma Press 5 Alton Road Wilmslow*

TRICKY

One of the things it is almost impossible to avoid when reviewing books is machine code. In particular, machine code on the Spectrum. There are so many books on the subject it is sometimes difficult to believe that there is anybody who has not yet mastered this tricky subject (except oneself, of course)

Practical Spectrum Machine Code is one of the relatively few number of books from Virgin better known (in computer circles) for its games.

To its credit, this is the first book on machine code that has begun to explain to me not so much how to load the A register with the value from the B rgister and put the los in the C register, but why this should make your laser cannon fire.

A good deal of the book is taken with the development of a machine-code *Space Invader* program which you develop section by section. Not only good but cheap(ish) too

Book	*Practical Spectrum Machine Code*
Price	*£3.95*
Micro	*Spectrum*
Supplier	*Virgin 61-63 Portobello Road London W11 3DD*

This Week

Program	*Type*	*Micro*	*Price*	*Supplier*
Special Delivery	Arc	Atari	£9.95	Creative Sparks
Richard	Arc	BBC B	£6.95	Virgin
Mini Office	Arc	BBC B	£5.95	Database
Macbeth	Ad	Commodore 64	£14.95	Creative Sparks
Bird Mother	Arc	Commodore 64	£7.95	Creative Sparks
Black Hawk	Arc	Commodore 64	£7.95	Creative Sparks
Dragon Master B.F.C.	Arc	Commodore 64	£7.95	Creative Sparks
Danger Mouse D.T	Arc	Commodore 64	£7.95	Creative Sparks
Falcon Patrol	Arc	Commodore 64	£6.95	Virgin
Sorcery	Arc	Commodore 64	£6.95	Virgin
Storm Warrior	Arc	Commodore 64	£7.95	Front Runner
RTTY	Ut	Commodore 64	£14.50	Grosvenor
Poster	Ut	Dragon	£39.50	Grosvenor
Transceive	Ut	Dragon	£19.95	Grosvenor
Lords of Time	Ad	Memotech	£9.90	Level 9
Snowball	Ad	Memotech	£9.90	Level 9
Delta Wing	Arc	Spectrum	£9.95	Creative Sparks
Kamikaze Collector	Arc	Spectrum	£1.99	Century City
Laser Lord	Arc	Spectrum	£1.99	Century City
Man Trap	Arc	Spectrum	£1.99	Century City
Pi'ia'era	Arc	Spectrum	£6.95	Automata
Piromania	Arc	Spectrum	£6.00	Automata
Poltergeist	Arc	Spectrum	£5.95	PSS
Rocket Man	Arc	Spectrum	£5.95	Software Farm
Sentinels	Arc	Spectrum	£1.99	Century City
Strange Loop	Arc	Spectrum	5.95	Virgin
Terrahawks	Arc	Spectrum	£6.95	CRL
The Bee	Arc	Spectrum	5.95	Virgin
Leonardo	Ut	Spectrum	£9.95	Creative Sparks
Truck Chase	Arc	Vic 20	£3.50	Blade
RTTY	Ut	Vic 20	£19.50	Grosvenor
Binary Brains	S	ZX81	£1.50	Poster
Handico	S	ZX81	£3.00	Poster

Key Ad — adventure/Arc — arcade/Ed — education/
S — strategy-simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD



Data protection

Try imagining how society would work without the written word. It's almost impossible, isn't it? Recorded information is the basis of modern life and much of that information consists of facts about people.

Such personal information is both valuable and sensitive and all sorts of organisations keep it — the DHSS doctors, dentists, schools, employers, manufacturers (often via those innocuous guarantee cards), banks, the police Information can range from a skeletal name and address, to a detailed wedge of highly pesonal data.

Yet until recently no one had any right whatsoever to know about what sort of information was being kept about them, or to have any control over it.

Now the government — under pressure from more liberal countries which already have such legislation — has introduced the Data Protection Act which will give people certain rights in relation to all such 'personal data' kept on them by other people.

The snag is that those rights will only apply to information held on computers — this despite the fact that 90 per cent of all files are still kept on paper.

The justification for this is that information stored on computer can be far more easily (and surreptitiously) recorded, expanded, tampered with or transferred.

Inevitably, though, this will leave a loophole. To get round the act 'data users', as the act calls those people who store such data, simply have to avoid computerising information (surely a backward step to encourage!)

What the act does is to create someone called the Data Protection Registrar — in this case Eric Howe, former deputy director of the National Computing Centre Once the act is fully in force which will take up to two years — anyone who wants to keep computerised personal data will have to register first and give lots of details about the kind of information they want to keep, where they will get it, and who they will allow to see it.

They will also have to comply with a number of 'principles' set out in the act, on such things as the way the information is collected ('fairly and lawfully'), the need for it to to be accurate and the obligation to keep it up to date

If requested they will have to tell an individual whether a file is being kept on him or her, and allow the person to see what information it contains. Inaccurate facts will have to be corrected and anyone who loses out either because of such inaccuracies or because information was disclosed to the wrong person, will be able to go to court and get damages

There are exceptions Government departments such as the Inland Revenue and the police, for example, will not necessarily have to show you the information which they have on file. Home computers used for 'domestic' reasons (ie, to do with personal, family or household affairs) are excluded, as are mailing lists provided they only contain names and addresses — and that the individuals concerned are asked first

Whether the act works or not will depend on the resources given to the Registrar, and on the tenacity with which he polices the system and investigates complaints.

Although the restriction to computerised files is a big loophole, at least the Act is a step towards a more open society

Gail Counsell

Hotcakes

Puzzle No 123

I popped into my local booksellers for a copy of the latest best selling novel *The Xanadu Conundrum* It was quite reasonably priced as far as these things go — the paperback version was £1 07 pence.

"We have it in hardback, also," said the assistant, and as it was intended as a present I changed my mind and opted for the more expensive edition.

"That title has been selling like hot cakes since the film version was shown on television over the weekend," remarked the shop assistant as my purchase was wrapped up "I've sold twenty copies of the hardback alone since we opened this morning and our total takings so far for both editions is now exactly one thousand pounds.

I took my package and my penny change from the six pounds that I had tendered, but as I left the shop and started wondering how many copies of the book in total they must have sold.

Can you say how many?

Solution to Puzzle No 118

In the program a value, X, is cubed, two million is subtracted from this and the result is tested to determine if its square root is a whole number, Y.

Note Line 50 which limits the accuracy of the square root value to avoid problems with small inaccuracies in this evaluation. The value of X must be 127 or greater as its cube must exceed two million.

```
10 X = 127 20 CUBE = X * X * X 30 SQUARE = CUBE —
2000000 40 ROOT = SQR (SQUARE) 50 ROOT =
VAL(STR$(ROOT)) 60 IF ROOT = INT(ROOT) THEN
PRINT X, ROOT 70 X = X + 1 80 GOTO 20
```

This reveals the alternative values of: $X = 129$ and $Y = 383$ $129^3 = 2,146,689$ and $383^2 = 146,689$

Winner of Puzzle No 118

The winner is Robert Daw, Leda Avenue, Hengrove Bristol, who receives £10

Rules

The closing date for entries to Puzzle No 123 is September 22.

The Hackers






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WATCHER, PILLOW-CASE! WHAT'S THE LATEST?
IF YOU CAME IN REGULARLY, PIMAN, YOU'D BE UP ON IT - AND STOP CALLING ME PILLOWCASE!
Gremlin Evans
MEL'S SELF IMPOSED BANISHMENT ENDS TODAY. WE'LL FIND OUT WHAT HE'S BEEN UP TO IN THIS CELL FOR THE PAST SIX MONTHS.
CRE-E-E-EAK
GOOD GRIEF! IT'S ONE MASS OF WIRES AND FLASHING LIGHTS IN HERE!
I HOPE THIS ISN'T GOING TO BE UNSIGHTLY...
AND... WOW! HERE COME SOME PEOPLE...
HELLO... AND GOODBYE... I MUST CATCH THE BANK!
WHO ARE YOU?
WHO I WAS
DOCTOR DOCTOR... WELBY. NO LIVINGSTONE
NOW YOU'RE JUST BEING PRESUMPTUOUS
KILDARE! DOCTOR KILDARE!!
EXIT
NOT QUITE. TRY 'WHO'
DOCTOR WHODARE?
IN THIS CASE, WHODARES DOESN'T WIN NOW. WHERE DID I PARK MY HARLEY?
THERE IS ANOTHER, MORE CRYPTIC JOKE IN HERE... BUT WE'VE NEITHER THE TIME NOR SPACE...
TRY HARLEY STREET! HEY LOOK! I KNOW WHO THIS IS! IT'S
OH GAWD - WHEN THEY HANDED OUT THE NOSES, YOU ASKED FOR MORE!!
AH - ERE, NO, LOOK, IT'S RUVE TO MUCK.
I'M IN THE MOOD TO ROCK. WATCHER, COCK! ALLOW ME TO HIT YOU WITH MY RHYTHM STICK
IT'S IT'S YOU KNOW! I'VE NEVER SEEN SO MANY STARS AT ONCE!!
IT'S AND CRIPES, FANCY MEETING... I KNOW THE FACES, BUT...
HOW DID THEY ALL GET IN HERE? AND WHY?
STRAIGHT AHEAD FOR CORRIDORS
'SCUSE ME I'VE GOT TO WRITE TO ME MOTHER...
DEUS EX MACHINA
WE'VE REACHED THE INNER SANCTUM AFTER WALKING FOR TEN MINUTES... THIS IS SOME CELL!
LOOK! IT'S MEL! HE'S PLUGGED INTO THAT...
IT'S FINISHED... WE'VE... DONE IT...
DONE IT? DONE WHAT?
TUNE IN NEXT WEEK AND SEE, SUCKERS!!
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PIROMANIA .... 48K Spec £6
PI IN'ERE .... 48K Spec £6
YAKZEE . Dragon/48K Spec £5
DEUS EX MACHINA .... 48K Spec £15
GO TO JAIL .... 48K Spec £6
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T SHIRTS State Size .... Price £6
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